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My Home Energy Report Program Evaluation

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1   Executive Summary

1.1   Program Summary

This report describes process and impact findings for the Duke Energy Carolinas and Duke Energy Progress My Home Energy Report (MyHER) offered to residential customers who live in single-metered, single family homes with thirteen months of usage history. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to that of a peer group of similar homes.[1] MyHER motivates customers to reduce their energy consumption by:

- Showing customers a comparison of their household electricity consumption to that of similar homes;

- Presenting a month-ahead forecast of electricity consumption disaggregated by end-use category;

- Suggesting tips for reducing energy use by changing customers' behavior or installing energy efficient equipment;

- Educating them about the energy savings benefits of Duke Energy's demand side management (DSM) programs; and

- Encouraging active management of their home's energy consumption.

1.2   Evaluation Objectives and High Level Findings

Nexant estimated the energy impacts associated with MyHER delivery for the period June 2017 to May 2018. This report also presents measurements of customer satisfaction and engagement for MyHER participants. The MyHER program is implemented as a randomized controlled trial (RCT). Customers are randomly assigned to either "treatment" or "control" groups for the purpose of measuring energy savings. Treatment customers are MyHER recipients (participants). The control group is a set of customers from whom the MyHER is intentionally withheld. The control group serves as the baseline against which MyHER impacts are measured. As Duke Energy customers become eligible for the MyHER program, Duke Energy randomly assigns them to one of these two groups.

The energy savings generated by the DEC MyHER program are presented in Table 1-1, showing that the evaluated impacts of the program are 248 kWh per household. The energy savings generated by the DEP MyHER program are presented in Table 1-2, showing that the evaluated impacts of the program are 201 kWh per household. These evaluated energy savings for the MyHER program are net of additional energy savings achieved through increased

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[1] Homes are grouped by characteristics such as location, size, vintage, and heating fuel. Energy use is compared on groups of similar homes.

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participation by the MyHER treatment group in other Duke Energy programs. Additional information concerning the evaluation period is shown in Table 1-3.

Table 1-1: DEC Deemed and Evaluated Energy Impacts per Participating Household

	Energy (kWh)	Confidence/Precision
Evaluated Impacts	248	90/6
Deemed Impacts	230	N/A

*MyHER is an opt-out program. As such, all impacts are considered net impacts; Nexant also calculated the impacts of the MyHER program by removing savings achieved by MyHER participants via other Duke Energy Programs.

Table 1-2: DEP Deemed and Evaluated Energy Impacts per Participating Household

	Energy (kWh)	Confidence/Precision
Evaluated Impacts	201	90/9
Deemed Impacts	148	N/A

*MyHER is an opt-out program. As such, all impacts are considered net impacts; Nexant also calculated the impacts of the MyHER program by removing savings achieved by MyHER participants via other Duke Energy Programs.

Table 1-3: Sample Period Start and End Dates

Evaluation Component	Start	End
Impact Evaluation Period	June 2017	May 2018
Customer Survey Period	January 2019	March 2019

1.3 Evaluation Recommendations

This evaluation finds the DEC MyHER program realized 137% of its claimed impacts and the DEP MyHER program realized 108% of its claimed impacts. The MyHER program remains fully deployed at these two Duke Energy jurisdictions, due to semiannual introductions of newly eligible customers to the treatment and control program populations. The continual addition of new customers to the program means that there will always be a mix of participants with respect to the duration of the customers' exposure to the treatment. Impacts delivered by behavioral programs such as MyHER have been shown in many evaluations of behavioral programs to vary depending on the length of that exposure, reaching maturity after 1-2 years of exposure to the program. As such, Duke Energy should generally expect that the newest cohorts of MyHER treatment customers will deliver lower energy savings than the established cohorts. In the case of DEC, some cohorts are attaining an age of 8 years.

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Duke Energy undertakes substantial work in partnership with their implementation contractor, Tendril, Inc., in planning and coordinating the delivery of MyHER reports to more than 1.1 million customers in the Carolinas and more than 680,000 customers at Duke Energy Progress. Duke Energy has developed a production process that allows for the customization of MyHER messages, tips, and promotions on the basis of customer information and exposure to Duke Energy's demand-side management programs. Since the prior MyHER evaluation[2], Tendril has implemented a number of improvements that have resulted in increased product quality, as evidenced by improved performance in Duke Energy's quality checks that take place before each batch of reports is sent to participants. The process evaluation finds that MyHER is successful in achieving its goal of enhancing customer motivation, awareness, and attention to saving energy in most areas probed by customer surveys.

Nexant has the following specific recommendations for enhancing Duke Energy's MyHER program:

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective status in a single billing month, to the extent that is technically feasible.

- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.

- **Increase MyHER participant awareness of Interactive.** The process evaluation finds that current awareness of Interactive among DEP and DEC MyHER participants is very low; another program objective above increasing aware customers' engagement with Interactive is to more effectively get the word out about its existence and increase the number of aware customers.

- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.

- **Continue to operate MyHER with an eye towards change management**. MyHER's implementer Tendril has made great strides in improving quality control performance since the prior DEC and DEP evaluations in the automation of quality control processes. Effective change management and stable staffing have been notable contributors to these improvements and they should continue to be emphasized in MyHER program

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[2] DEC was previously evaluated in February 2016. DEP was previously evaluated in July 2017.

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operations, especially as Tendril's new HER production platform, HOMERS (the Home Energy Reporting Service), is rolled out and its implementation is optimized.

- **Continue to prioritize the structuring of the processes and schedules for program elements**. Improved organization of tasks for elements such as the FFT report module has been a significant success in the operations of the MyHER program and has made reactive responses to impending deadlines and emergent challenges that characterized these operations in the past much less common. Program staff should seek out additional opportunities for the optimization of program schedules, tasks, and long term goals in this manner.

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2   Introduction and Program Description

This section presents a brief description of the My Home Energy Report (MyHER) program as it is operated in the DEC and DEP service territories during the evaluation timeframe. This description is informed by document review, in-depth interviews with staff, and Nexant's understanding of program nuance developed through regular communication during the evaluation process.

2.1   Program Description

The MyHER program is a Duke Energy Carolinas and Duke Energy Progress behavioral product for demand-side management (DSM) of energy consumption and generation capacity requirements. The MyHER presents a comparison of participants' energy use to a peer group of similar homes. It is sent by direct mail eight times a year, and 12 times a year by email to customers that have provided Duke Energy with their email address.[3] The MyHER provides customer-specific information that allows customers to compare their energy use for the month and over the past year to the consumption of similar homes as well as homes considered to be energy-efficient. Reports include seasonal and household-appropriate energy savings tips and information on energy efficiency programs offered by Duke Energy. Many tips include low cost suggestions such as behavioral changes. An additional feature presents a month-ahead forecast of energy usage disaggregated by end-use type. Duke Energy contracts with Tendril Inc. for the management and delivery of its MyHER product.

Duke Energy also launched the MyHER Interactive Portal[4] in March 2015. MyHER Interactive seeks to engage customers in a responsive energy information and education dialogue. When customers enroll in the online portal they are given the opportunity to update and expand on information known to Duke Energy about their home and electricity consumption. Customers who have registered to use MyHER Interactive are also sent weekly energy management tips and conservation challenges via email. The general strategy of MyHER Interactive is to open communications between customers and the utility, as well as to explore new ways of engaging households in electricity consumption management.

Customers occupying single-family homes with an individual electric meter and at least thirteen months of electricity consumption history are eligible for MyHER in Duke Energy Carolinas and Duke Energy Progress territories in North Carolina and South Carolina. The program is an opt-out program: customers can notify Duke Energy if they no longer wish to receive a MyHER and will be subsequently removed from the program. Customers who receive both paper and email

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[3] For clarity: MyHERs are only sent to customers randomly assigned to the treatment group. All of the customers in the treatment group receive paper MyHERs 8 times a year. Duke Energy has email contact information for some of the treatment customers – those email customers also receive email MyHERs 12 times a year. Therefore, the email customers receive both an email and paper MyHER 8 months of the year and only an email report 4 months of the year.

[4] We refer to the MyHER Interactive Portal simply as "Interactive" in the remainder of this report.

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MyHERs may also opt out of the report format of their choice (i.e., elect to only receive MyHERs by email, or only receive them by U.S. Mail).

Duke Energy placed a portion of eligible customers into a control group to satisfy evaluation, measurement, and verification (EM&V) requirements. These control group customers are not eligible to participate in the MyHER program.

Duke Energy has several objectives for the MyHER program, including:

1. Generating cost effective energy savings;

2. Increasing customer awareness of household energy use, engagement with Duke Energy, and overall customer satisfaction with services provided by Duke Energy; and

3. Promoting other energy efficiency and demand response program options to residential customers.

2.2 Implementation

MyHER is implemented by Tendril Inc., a behavioral science and analytics contractor that prepares and distributes the MyHER reports according to a pre-determined annual calendar. Tendril also generates and disseminates the MyHER Interactive Portal content and email reports, energy savings tips, and energy savings challenges. Tendril and Duke Energy coordinate closely on the data transfer and preparation required to successfully manage the MyHER program, and they make adjustments as needed to provide custom tips and messages expected to reflect the characteristics of specific homes. A more detailed discussion of the roles and responsibilities of both organizations is provided in Section 4.

Eligibility

The single-family MyHER program targets residential customers living in single-family, single meter, non-commercial homes with at least thirteen months of electricity consumption history. Approximately 1,174,000 DEC and 695,000 DEP residential customers met those requirements as of May 2018 and are assigned to the MyHER treatment groups. Accounts could still be excluded from the program for reasons such as the following: different mailing and service addresses and enrollment in payment plans based on income (although Equal Payment Plan customers are eligible). Eligibility criteria for the MyHER program have changed over time, and in some cases, customers were assigned to either treatment or control but later determined to be ineligible for the program. Nexant estimates that approximately 2% of assigned DEC customers and 1% of assigned DEP customers have been deemed ineligible for the program after having been assigned. Nexant addresses this topic by applying an intention-to-treat analysis (ITT); refer to Section 3.1.2.

2.3 Key Research Objectives

The section describes our key research objectives and associated evaluation activities.

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2.3.1 Impact Evaluation Objectives

The primary objective of the impact evaluation is to describe the impact of the program on energy consumption (kWh). Savings attributable to the program are measured across an average annual and monthly time period. The following research questions guided impact evaluation activities:

1. Is the process used to select customers into treatment and control groups unbiased?

2. What is the impact of MyHER on the uptake of other Duke Energy programs (downstream and upstream) in the market?

3. What net energy savings are attributable solely to MyHER reports after removing savings already claimed by Duke Energy's other energy efficiency programs?

4. What incremental savings are achieved by customers participating in the MyHER Interactive portal?

2.3.2 Process Evaluation Objectives

The program evaluation also seeks to identify improvements to the business processes of program delivery. Process evaluation activities focused on how the program is working and opportunities to make MyHER more effective. The following questions guided process data collection and evaluation activities:

1. Are there opportunities to make the program more efficient, more effective, or to increase participant engagement?

2. What components of the program are most effective and should be replicated or expanded?

3. What additional information, services, tips or other capabilities should MyHER consider?

4. Does MyHER participation increase customer awareness of their energy use and interest in saving energy?

5. What elements of the reports are useful to recipients?

6. How satisfied are recipients with MyHER reports?

7. To what extent does receiving MyHER increase customer engagement in energy saving behaviors and upgrades?

8. Do participants hold more favorable opinions of Duke Energy as a result of receiving the reports?

9. What encourages or prevents households from acting upon information or tips provided by MyHER?

10. To what degree are recipients aware of, and making use of, MyHER Interactive?

11. How can the program encourage additional action?

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2.4 Organization of This Report

The remainder of this report contains the results of the impact analysis (Section 3); the results of the process evaluation activities, including the customer surveys (Section 4); and Nexant's conclusions and recommendations (Section 5).

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3 Impact Evaluation

3.1 Methods

A key objective of the MyHER impact evaluation is to measure the change in electricity consumption (kWh) resulting from exposure to the normative comparisons and conservation messages presented in Duke Energy's My Home Energy Reports. The approach for estimating MyHER impacts is built into the program delivery strategy. Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.

The impact estimate is based on monthly billing data and program participation data provided by Duke Energy. The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program. After estimating the total change in energy consumption in treatment group homes, Nexant performed an "overlap analysis", which quantifies the savings associated with increased participation by treatment homes in other DEC or DEP energy efficiency offerings. These savings were claimed by other programs; therefore, they are subtracted from the MyHER impact estimates to eliminate double-counting.

3.1.1 Data Sources and Management

The MyHER impact evaluation relied on a large volume of participation and billing data from Duke Energy's data warehouse. Nexant provided a data request for the necessary information in July 2018. Key data elements include the following:

- **Participant List** – a table listing each of the homes assigned to the MyHER program since its 2010 inception in DEC and its 2014 inception in DEP. This table also indicated whether the account was in the treatment or control group and the date the home was assigned to either group. Duke Energy also provided a supplemental table of Acxiom demographic data for program participants.

- **Billing History** – a monthly consumption (kWh) history for each account in the treatment and control group. Records included all months since assignment as well as the pre-assignment usage history required for eligibility. This file also included the meter read date and the number of days in each billing cycle.

- **MyHER Report History** – a record of the approximate 'drop date' of each MyHER report sent to the treatment group accounts, the messaging included, and the recommended actions. This dataset also contained a supplemental table of treatment group accounts omitted from each MyHER mailing during the evaluation period, and the associated reason for omission.

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▪ **Participation Tracking Data for Other Energy Efficiency Programs offered by Duke Energy** – a table of the Duke DSM program participation of MyHER control and treatment group accounts. Key fields for analysis include the measure name, quantity, participation date, and net annual kWh and peak demand impacts per unit for each MyHER recipient and control group account participating in other DSM programs offered by Duke Energy.

In preparation for the impact analysis, Nexant combined and cleaned the participation and billing data provided by the MyHER program staff and then combined with the cleaned dataset from Nexant's prior MyHER impact evaluation for that jurisdiction.[5] The combined billing dataset includes 1,652,515 distinct DEC accounts and 1,011,440 distinct DEP accounts (the actual number varies by month). A number of treatment and control accounts in this dataset have closed prior to the start of this evaluation period (May 2016) and they have been dropped from the analysis dataset. For DEC, there were 306,131 such treatment customers and 126,142 such control customers. For DEP, there were 86,346 such treatment customers and 12,722 such control customers.

Nexant also removed the following accounts or data points from the analysis (total for DEC and DEP):

▪ 7,459 accounts that had a negative value for billed kWh;

▪ 710 records with unrealistically high usage: any month with greater than six times the 99th percentile value for daily kWh usage, or approximately 900 kWh per day.

Like most electric utilities, Duke Energy does not bill its customers for usage within a standard calendar month interval. Instead, billing cycles are a function of meter read dates that vary across accounts. Since the interval between meter reads vary by customer and by month, the evaluation team "calendarized" the usage data to reflect each calendar month, so that all accounts represent usage on a uniform basis. The calendarization process includes expanding usage data to daily usage, splitting the billing month's usage uniformly among the days between reads. The average daily usage for each calendar month is then calculated by taking the average of daily usage within the calendar month.

3.1.2 Intention to Treat

Duke Energy maintains a number of eligibility requirements for continued receipt of MyHER. Not all accounts assigned to treatment remained eligible and received MyHER over the study horizon. Several programmatic considerations can prevent a treatment group home from receiving MyHER in a given month. Common reasons for an account not being mailed include the following:

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[5] Rather than re-requesting all of the data necessary for this evaluation (pre-treatment and posttreatment usage data for all treatment and control customers), Nexant omitted any data that we already had from the first evaluation – the pre-treatment data for cohorts included in our prior evaluation is still necessary for this current evaluation.

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- **Mailing Address Issues** – mailing addresses are subjected to deliverability verification by the printer. If an account fails this check due to an invalid street name or PO Box or has another issue, the home will not receive the MyHER.

- **Implausible Bill** – if a home's billed usage for the previous month is less than 150 kWh or greater than 10,000 kWh, Tendril does not mail the MyHER.

- **Insufficient Matching Households** – this filter is referred to as "Small Neighborhood" by Tendril and is a function of the clustering algorithm Tendril uses to produce the usage comparison. If a home can't be clustered with a sufficient number of other homes, it will not receive the MyHER.

- **No Bill Received** – if Tendril does not receive usage data for an account from Duke within the necessary time frame to print and mail, the home will not receive MyHER for the month.

The Nexant data cleaning steps listed in Section 3.1.1 do not impose these filters on the impact evaluation analysis dataset. This is necessary to preserve the RCT design because eligibility filters are not applied to the control group in the same manner as the treatment group. Instead, Nexant employed an "intention-to-treat" (ITT) analysis. In the ITT framework, the average energy savings per home *assigned* to the treatment is calculated via billing analysis. This impact estimate is then divided by the proportion of the treatment group homes analyzed that were active MyHER participants. The underlying assumption of this approach is all of the observed energy savings are being generated by the participating accounts.

Nexant relied on Duke Energy's monthly participation counts for the numerator of the proportion treated calculation. MyHER program staff calculates participation monthly according to the business rules and eligibility criteria in place at the time. The denominator of the proportion treated is the number of treatment group homes with billed kWh usage for the bill month. This calculation is presented by month in Table 3-1 and Table 3-2 for the study period. The average proportion of assigned accounts that were treated during the period of June 2017 to May 2018 was 98% for both DEC and DEP.

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Table 3-1: DEC Calculation of Treatment Percentage by Bill Month

Month	Treatment Homes Analyzed	DEC Participant Count	% Treated
06/2017	1,231,705	1,197,462	97%
07/2017	1,218,640	1,198,133	98%
08/2017	1,207,107	1,171,813	97%
09/2017	1,195,242	1,172,053	98%
10/2017	1,185,902	1,172,053	99%
11/2017	1,225,916	1,195,285	98%
12/2017	1,216,916	1,191,881	98%
01/2018	1,208,915	1,193,353	99%
02/2018	1,200,827	1,178,403	98%
03/2018	1,192,681	1,177,960	99%
04/2018	1,183,803	1,157,514	98%
05/2018	1,173,821	1,151,896	98%
12-month Average Proportion			**98%**

Table 3-2: DEP Calculation of Treatment Percentage by Bill Month

Month	Treatment Homes Analyzed	DEP Participant Count	% Treated
06/2017	727,455	682,040	94%
07/2017	719,693	713,994	99%
08/2017	712,653	701,172	98%
09/2017	705,487	700,125	99%
10/2017	699,920	700,125	100%
11/2017	726,344	710,313	98%
12/2017	720,920	707,899	98%
01/2018	715,954	708,355	99%
02/2018	711,221	697,726	98%
03/2018	706,614	698,443	99%
04/2018	701,195	693,815	99%
05/2018	695,352	689,886	99%
12-month Average Proportion			**98%**

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The monthly participation counts shown in Table 3-1 and Table 3-2 were also used by Nexant to estimate the aggregate impacts of the MyHER. Per-home kWh savings estimates for each bill month are multiplied by the number of participating homes to arrive at the aggregate MWh impact achieved by the program.

3.1.3 Sampling Plan and Precision of Findings

The MyHER program was implemented as an RCT in which individuals were randomly assigned to a treatment (participant) group or a control group for the purpose of estimating changes in energy use because of the program. Nexant's analysis methodology relies on a census analysis of the homes in both groups so the resulting impact estimates are free of sampling error. However, there is inherent uncertainty associated with the impact estimates because random assignment produces a statistical chance that the control group consumption would not vary in perfect harmony with the treatment group, even in the absence of MyHER exposure. The uncertainty associated with random assignment is a function of the size of the treatment and control groups. As group size increases, the uncertainty introduced by randomization decreases, and the precision of the estimates improves.

Nexant's MyHER impact estimates are presented with both an absolute precision and relative precision. Absolute precision estimates are expressed in units of annual energy consumption (kWh) or as a percentage of annual consumption.

The two following statements about the MyHER impact analysis reflect absolute precision:

- DEC MyHER saved an average of 247.7 kWh per home during the 12-month period June 2017 to May 2018, ± 16.0 kWh. Homes in the treatment group reduced electric consumption by an average of 1.69%, ± 0.11%.

- DEP MyHER saved an average of 201.2 kWh per home during the 12-month period June 2017 to May 2018, ± 18.9 kWh. Homes in the treatment group reduced electric consumption by an average of 1.25%, ± 0.12%.

In these examples, the uncertainty of the estimate, or margin of error (denoted by "±"), is presented in the same absolute terms as the impact estimate—that is, in terms of annual electricity consumption. Nexant also includes the relative precision of the findings. Relative precision expresses the margin of error as a percentage of the impact estimate itself. Consider the following examples:

- The average treatment effect of DEC MyHER during the 12-month period June 2017 to May 2018 is 247.7 kWh with a relative precision of ± 6.4%. In this case, ± 6.4% is determined by dividing the absolute margin of error by the impact estimate: 16.0÷247.7 = 0.064 = 6.4%.

- The average treatment effect of DEP MyHER during the 12-month period June 2017 to May 2018 is 201.2 kWh with a relative precision of ± 9.4%. In this case, ± 9.4% is determined by dividing the absolute margin of error by the impact estimate: 18.9÷201.2 = 0.094 = 9.4%.

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All of the precision estimates in this report are presented at the 90% confidence level and assume a two-tailed distribution.

3.1.4 Assignment Cohorts and Equivalence Testing

The DEC and DEP MyHER program has been growing over time since its DEC launch in 2010 and DEP launch in 2014. Nexant mapped the DEC MyHER population into eight cohorts and DEP MyHER population into six cohorts. The cohort groupings are defined on a temporal basis, generally following the major periods when customers were assigned to treatment and control groups. Cohorts that had been defined in prior evaluations of the DEC and DEP programs were maintained for consistency.

Figure 3-1 shows the timeline of DEC program expansion by cohort since May 2016. The original pilot cohort started the program in April 2010 which was followed by a large expansion of customers who were added in 2012 and 2013, mainly in September 2012. A second large cohort was added in 2014 and 2015, mainly in December 2014. The program has continued to expand since 2015, in more modest increments relative to the 2012 - 2013 and 2014 - 2015 expansions, as newer customers met the program's eligibility criteria. In October 2015, Duke Energy also released a small number of DEC customers originally assigned to the control group into treatment from the April 2010, 2012 - 2013, and 2014 – 2015 cohorts. These cohorts are denoted with "Release" in Figure 3-1.[6] These customers were released into treatment starting in October 2015, and began producing impacts in November 2015.

Figure 3-1: History of Cohort Assignments for DEC MyHER Program

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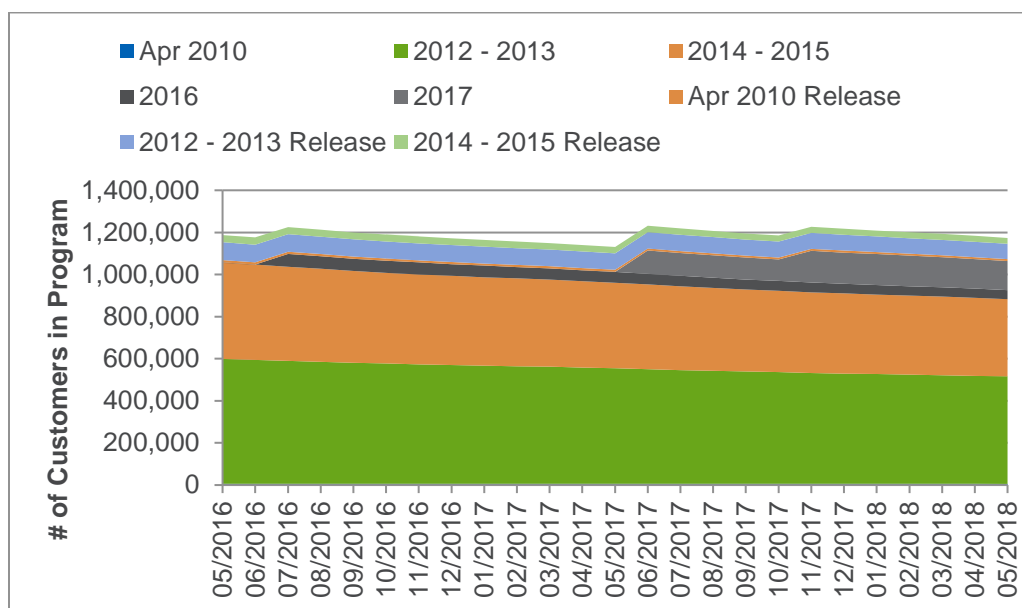
[6] Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. Four relatively small releases (approximately 110,000 customers total) from the DEC jurisdiction was recommended by that review. Consequently, about 110,000 control group customers from the April 2010, September 2012, December 2014, and January 2015 cohorts were randomly selected for release into treatment.

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Approximately 26% of DEC MyHER treatment customers were not assigned to the program simultaneously with a control group, and were bundled into cohorts with treatment customers assigned around the same time, consistent with the prior DEC evaluations. Nexant has advised Duke Energy to continue a simultaneous assignment protocol and to make assignments on an annual or biennial basis. Doing so will minimize any potential sources of bias that could occur due to a lack of simultaneous assignment to treatment and control.

Figure 3-2 shows the timeline of DEP program expansion by cohort since May 2016. A large original cohort started the program in December 2014. The program has continued to expand since 2014, in more modest increments relative to the original cohort, as newer customers met the program's eligibility criteria. In October 2015, Duke Energy also released a small number of DEP customers originally assigned to the control group into treatment from the December 2014 cohort. This cohort is denoted with "Release" in Figure 3-2.[7] These customers were released into treatment starting in October 2015, and began producing impacts in November 2015.

Figure 3-2: History of Cohort Assignments for DEP MyHER Program
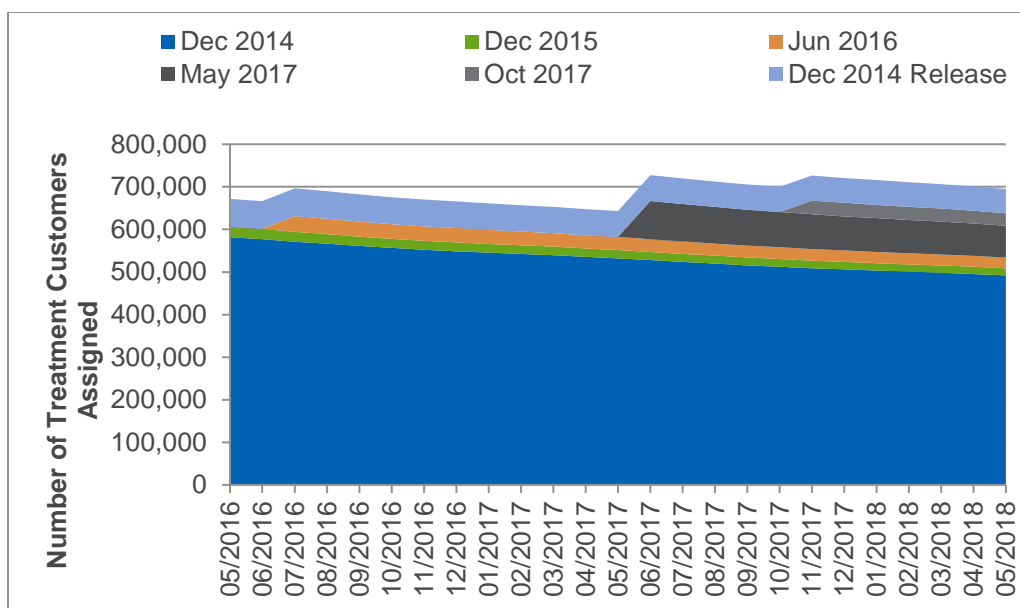
Approximately 8% of DEP MyHER treatment customers were not assigned to the program simultaneously with a control group, and were bundled into cohorts with treatment customers assigned around the same time. These cohort definitions are consistent with those used in the previous evaluation. Simultaneous assignment will minimize any potential sources of bias that could occur due to a lack of simultaneous assignment to treatment and control.

Straightforward impact estimates are a fundamental property of the RCT design. Random assignment to treatment and control produces a situation in which the treatment and control

[7] Duke Energy commissioned a review of the MyHER control groups in 2015 to assess whether or not there were any control groups that were larger than necessary for the purpose of EM&V. A release of 60,000 customers from the DEP jurisdiction was recommended by that review. Consequently, about 60,000 control group customers from the December 2014 cohort were randomly selected for release into treatment.

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groups are statistically identical on all dimensions prior to the onset of treatment; the only difference between the treatment and control groups is exposure to MyHER. The impact is therefore simply the difference in average electricity consumption between the two groups. The first step to assessing the impact of an experiment involving a RCT is to determine whether or not the randomization worked as planned.

Table 3-3 presents summary information for each of the eight cohorts included in Nexant's DEC analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. On an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("2017").

Table 3-3: DEC MyHER Cohort Summary Statistics

Cohort		Pretreatment Period		# Homes		Annual kWh in Pretreatment Period	
		Start	End	Control	Treatment	Control	Treatment
1	Apr 2010	04/2009	03/2010	9,535	6,173	17,871	17,893
2	2012 - 2013	09/2011	08/2012	30,566	527,684	14,392	14,528
3	2014 - 2015	12/2013	11/2014	26,376	383,024	14,782	14,684
4	2016	06/2015	05/2016	19,848	61,332	13,324	13,402
5	2017	05/2016	04/2017	27,388	161,317	13,204	13,554
6	Apr 2010 Release	04/2009	03/2010	9,535	10,689	17,871	17,732
7	2012 - 2013 Release	09/2011	08/2012	30,566	85,505	14,392	14,486
8	2014 - 2015 Release	12/2013	11/2014	26,376	35,809	14,782	14,660

Since MyHER is evaluated on a month basis, the more important equivalency check is on month-to-month comparability between treatment and control groups. Figure 3-3 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEC Cohort 2 ("2012 - 2013"), the largest treatment cohort of the DEC MyHER program. The figure depicts the distribution of monthly average consumption from September 2011 to August 2012, the time period prior to the launch of the cohort. This figure represents usage of all accounts assigned to treatment and control in this cohort. The plot illustrates that usage patterns of the treatment and control customers are grossly similar, however t-tests on the mean consumption for treatment and control groups reveals statistically significant differences between treatment and control customers during much of the pretreatment period. For example, the cohort shown in Figure 3-3 has statistically significant differences between treatment and control groups in 11 of 12 months in the year immediately prior to the onset of treatment. Across all eight DEC cohorts, the number of pretreatment months that show statistically different differences between treatment and control customers ranges from 0 to 12. These differences will need to be addressed by the estimation procedure, as we describe later in this section.

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Figure 3-3: DEC Difference in Average Pre-treatment Billed Consumption (kWh)

Cohort 2, Pretreatment Equivalence

Control   Treatment

excludes outside values
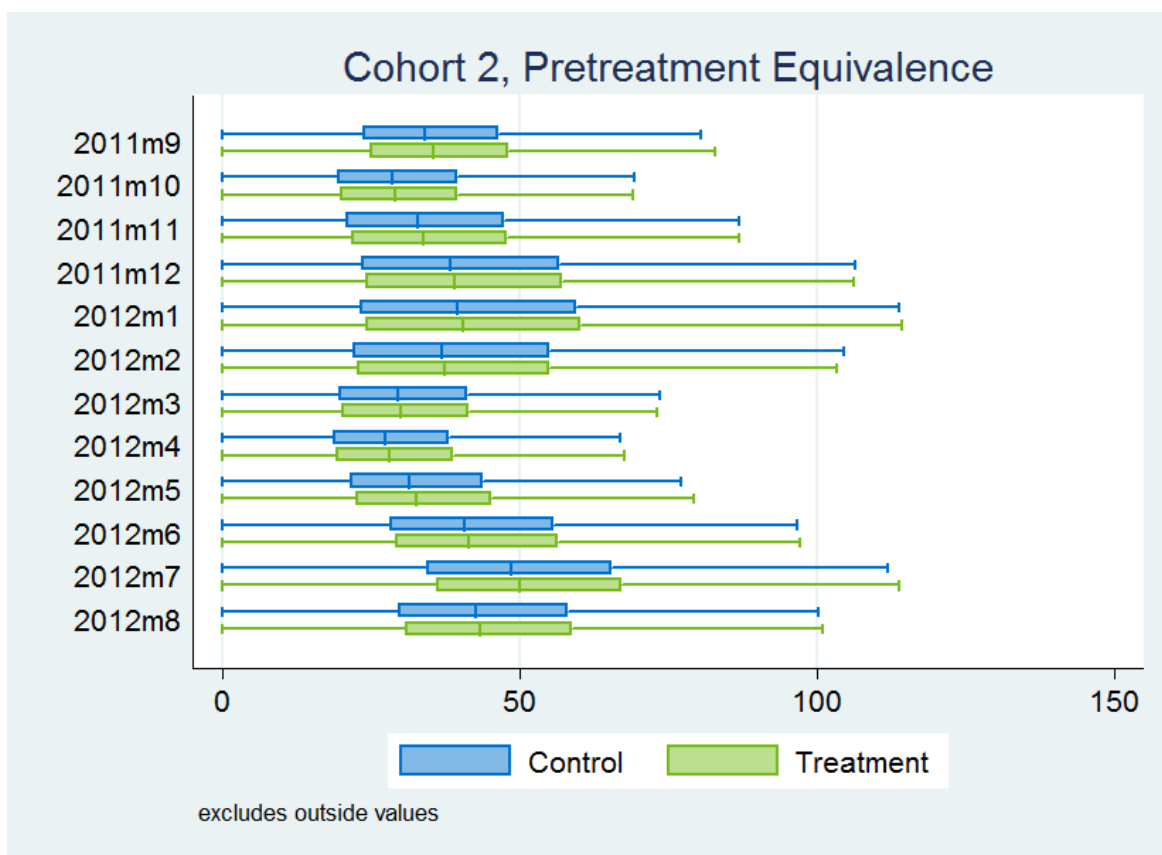
Considering the DEP program, Table 3-4 presents summary information for each of the six cohorts included in Nexant's analysis, comparing the average annual kWh usage of each cohort's treatment and control group for the 12 months prior to the beginning of assignment. Here as in DEC, on an annual basis, the pre-assignment usage is relatively balanced between groups for each of these cohorts, where the largest difference occurs in Cohort 5 ("October 2017") which is the smallest cohort in terms of the number of both treatment and control customers.

Table 3-4: DEP MyHER Cohort Summary Statistics

Cohort		Pre-Period		# Homes		Annual kWh in Pre-Period	
		Start	End	Control	Treatment	Control	Treatment
1	Dec 2014	12/2013	11/2014	72,590	565,291	16,852	16,773
2	Dec 2015	12/2014	11/2015	8,086	24,482	14,826	14,628
3	Jun 2016	06/2015	05/2016	16,579	37,011	13,765	13,860
4	May 2017	05/2016	04/2017	7,102	94,947	15,121	15,060
5	Oct 2017	10/2016	09/2017	12,401	33,879	13,636	13,838
6	Dec 2014 Release	12/2013	11/2014	72,590	65,869	16,852	16,847

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On a month-to-month basis, DEP's cohorts perform similarly to DEC's cohorts in terms of equivalence in treatment and control group usage. Figure 3-4 is a box-and-whisker plot of the average pre-treatment consumption for the treatment and control groups of DEP Cohort 1 ("December 2014"), the largest treatment cohort of the DEP MyHER program. The figure depicts the distribution of monthly average consumption from December 2013 to November 2014, the time period prior to the launch of the cohort. This figure represents usage of all accounts assigned to treatment and control in this cohort. As was the case for DEC, this largest of DEP cohorts grossly demonstrates monthly equivalence of treatment and control group usage, but the differences in mean monthly consumption are actually statistically significant for all 12 months of the year immediately preceding the onset of treatment. Across the six DEP cohorts, the number of months of the year immediately prior to the onset of treatment that treatment and control group usage is statistically different ranges from 0 to 12. These differences will need to be taken into account during estimation.

Figure 3-4: DEP Difference in Average Pre-treatment Billed Consumption (kWh)

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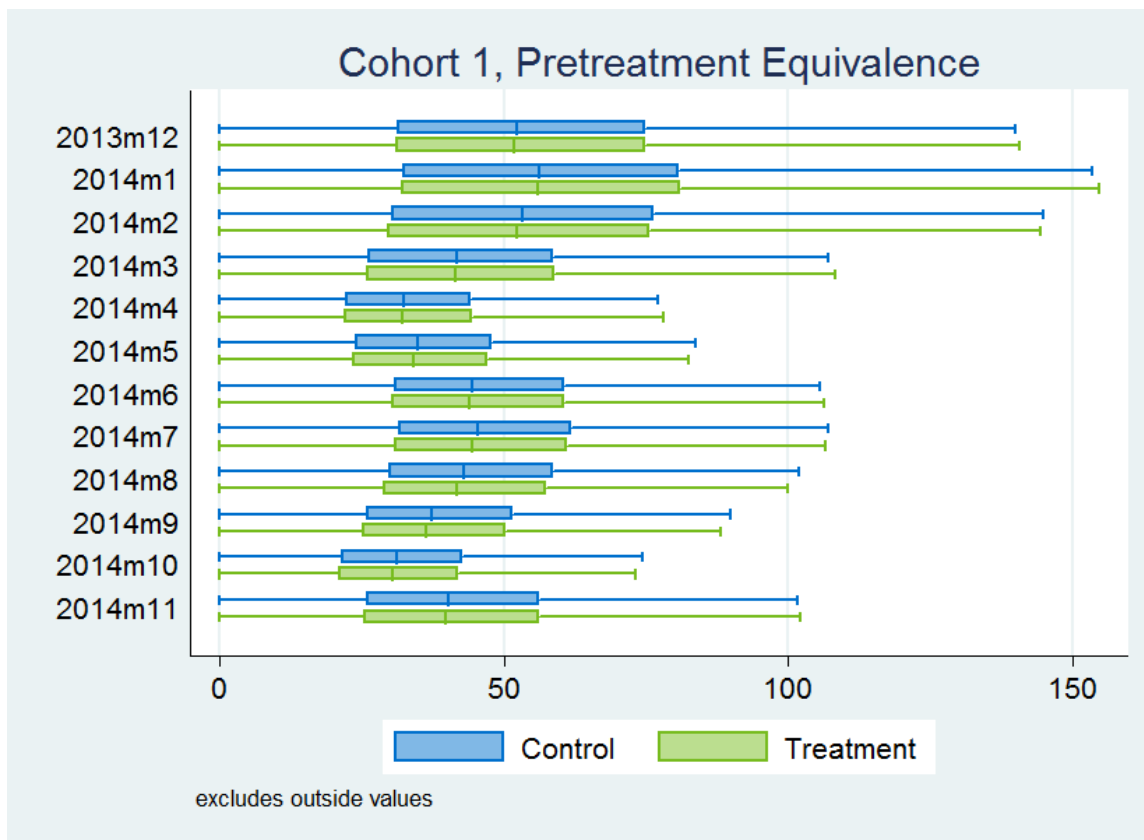
3.1.5 Regression Analysis

Separating the MyHER population into cohorts accounts for cohort maturation effects and improves statistical precision relative to differences among the cohorts. Nevertheless, as discussed above, there are still small, but significant, underlying differences between the cohort treatment and control groups that need to be netted out via a difference-in-differences approach. Nexant applied a linear fixed effects regression (LFER) model to account for the month-to-month differences in electricity usage observed in the pre-treatment period between the treatment and control groups. The basic form of the LFER model is shown in Equation 3-1. Average daily electricity consumption for treatment and control group customers is modeled using an indicator variable for the billing period of the study, a treatment indicator variable, and a customer-specific intercept term:

Equation 3-1: Fixed Effects Model Specification

$$\text{kWh}_{ity} = \text{customer}_i * \beta_i + \sum_{t=1}^{12} \sum_{y=2009}^{2018} I_{ty} * \beta_{ty} + \sum_{t=1}^{12} \sum_{y=2009}^{2018} I_{ty} * \tau_{ty} * \text{treatment}_{ity} + \varepsilon_{ity}$$

Table 3-5 provides additional information about the terms and coefficients in Equation 3-1.

Table 3-5: Fixed Effects Regression Model Definition of Terms

Variable	Definition
kWh_{ity}	Customer i's average daily energy usage in billing month t of year y
customer_i	An indicator variable that equals one for customer i and zero otherwise. This variable models each customer's average energy use separately.
β_i	The coefficient on the customer indicator variable. Equal to the mean daily energy use for each customer.
I_{ty}	An indicator variable equal to one for each monthly billing period t, year y and zero otherwise. This variable captures the effect of each billing period's deviation from the customers' average energy use over the entire time series under investigation.
β_{ty}	The coefficient on the billing period t, year y indicator variable.
treatment_{ity}	The treatment variable. Equal to one when the treatment is in effect for the treatment group. Zero otherwise. Always zero for the control group.
τ_{ty}	The estimated treatment effect in kWh per day per customer in billing month t of year y; the main parameter of interest.
ε_{ity}	The error term.

Nexant estimated the LFER model separately for each of the randomized cohorts included in the analysis for each jurisdiction. Detailed regression outputs can be found in Appendix A. The model specification includes an interaction term between the treatment indicator variable and the indicator variable for the bill month term. This specification generates a separate estimate of the MyHER daily impact for each month.

Table 3-6 illustrates the calculation of monthly impact estimates from the regression model coefficients for homes in the DEC 2012 - 2013 cohort (DEC Cohort 2). The monthly savings shown in Table 3-6 are the unweighted point estimates for that cohort. Each month's average

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treatment effect is multiplied by an assumed number of days in the month equal to 365.25/12 = 30.4375.

Table 3-6: Impact Calculation Example – DEC Cohort 2

Month	Daily Treatment Coefficient (τ)	Monthly Impact (kWh)
06/2017	-0.2310	-7.0
07/2017	0.1645	5.0
08/2017	0.1487	4.5
09/2017	-0.5932	-18.1
10/2017	-0.4416	-13.4
11/2017	-1.1360	-34.6
12/2017	-1.9676	-59.9
01/2018	-1.0220	-31.1
02/2018	-1.2419	-37.8
03/2018	-1.2941	-39.4
04/2018	-1.0254	-31.2
05/2018	-0.6825	-20.8
12-month Total		**-283.7**

Impact estimates by cohort were combined for each month using a weighted average where the weighting factor is the number of homes with billing data that had been assigned to the treatment group during a prior month (e.g., were in the post-treatment period). These estimates of the average MyHER impact per assigned home were then divided by the proportion of customers treated, as shown in Table 3-1 and Table 3-2, to estimate the average treatment effect per participating home.

3.1.6 Dual Participation Analysis

The regression model outputs and subsequent intention-to-treat adjustments discussed in Section 3.1.5 produce estimates of the total change in electricity consumption in homes exposed to MyHER. Some portion of the savings estimated by the regression is attributable to the propensity of MyHER treatment group homes to participate in other energy efficiency offerings at Duke Energy at a greater rate than control group homes. The primary purpose of the dual participation analysis is to quantify annual electricity savings attributable to this incremental DSM participation and subtract it from the MyHER impact estimates. This downward adjustment prevents savings from being double-counted by both the MyHER program and the program where savings were originally claimed.

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A secondary objective of the dual participation analysis is to better understand the increased DSM participation, or "uplift" triggered by inclusion of marketing messages within MyHER. The ability to serve as a marketing tool for other DSM initiatives is an important part of what makes MyHER attractive as Duke Energy assumes the role of a trusted energy advisor with its customer base.

Duke Energy EM&V staff provided Nexant with a dataset of non-MyHER program participation records for the MyHER treatment and control group homes dating back to January 2015. This dataset included nearly 439,000 records of efficient measure installations by the MyHER treatment and control group and formed the basis of Nexant's dual participation analysis.

Table 3-7 and Table 3-8 shows the distribution of participation and savings during the 12-month period June 2017 to May 2018 across DEC and DEP's residential portfolio, respectively.

Table 3-7: DEC Total EE Program Participation among MyHER Customers

Program Name	Number of Records	Net MWh/year	Net kW/year
DE Residential EE Products & Services	181,353	36,612	12,092
DE Smart Saver Residential	243,630	152,553	31,754
Residential Energy Assessments	13,584	15,457	2,530
Total	**438,567**	**204,622**	**46,376**

Table 3-8: DEP Total EE Program Participation among MyHER Customers

Program Name	Number of Records	Net MWh/year	Net kW/year
DEP Home Energy Improvement	17,585	5,435	1,429
DEP Neighborhood Energy Saver	2,534	1,144	174
DEP New Construction Program	30	1	1
DEP ResEE Multi-Family	4,739	1,172	118
DEP Residential Energy Assessment	10,494	11,758	1,955
DEP Single Family Water Measures	115,504	30,605	10,199
DEP Smart Saver Residential	8,672	11,021	4,297
Total	**159,558**	**61,137**	**18,173**

The MyHER dual participation analysis included the following steps:

- Match the data to the treatment and control homes by Account ID

- Assign each transaction to a bill month based on the participation date field in the tracking data

- Exclude any installations that occurred prior to the home being assigned to the treatment or control group

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- Calculate the daily net energy savings for each efficiency measure
- Sum the daily net energy impact by Account ID for measures installed prior to each bill month
- Calculate the average savings per day for the treatment and control groups by bill month. This calculation is performed separately for each cohort
- Calculate the incremental daily energy saved from energy efficiency (treatment – control) and multiply by the average number of days per bill month (30.4375)
- Take a weighted average across cohorts of the incremental energy savings observed in the treatment group
- Subtract this value from the LFER estimates of treatment effect for each bill month

Table 3-9 shows the dual participation calculations, by bill month, for homes in the DEC 2012 – 2013 Cohort (DEC Cohort 2). Savings from energy efficiency measures climb steadily over time in both groups as additional efficient technologies are installed through Duke Energy's residential energy efficiency portfolio. The treatment group's impacts increase at a slightly greater rate, so the incremental energy savings subtracted from the MyHER treatment effect generally grows as a cohort's duration of exposure lengthens.

Table 3-9: Incremental Energy Efficiency Savings Calculation Example – DEC Cohort 2

Month	Mean Daily EE kWh Impact (Control)	Mean Daily EE kWh Impact (Treatment)	Incremental Daily kWh from EE (Treatment – Control)	Uplift %	Incremental kWh Savings
06/2017	0.354	0.381	0.027	7.6%	0.82
07/2017	0.369	0.395	0.026	7.2%	0.80
08/2017	0.384	0.412	0.028	7.3%	0.85
09/2017	0.406	0.435	0.029	7.1%	0.88
10/2017	0.428	0.459	0.031	7.2%	0.94
11/2017	0.445	0.476	0.031	7.0%	0.95
12/2017	0.459	0.492	0.033	7.2%	1.01
01/2018	0.477	0.511	0.034	7.2%	1.04
02/2018	0.488	0.523	0.035	7.1%	1.06
03/2018	0.506	0.540	0.034	6.7%	1.04
04/2018	0.527	0.561	0.034	6.5%	1.05
05/2018	0.541	0.576	0.035	6.5%	1.06
12-month Total					**11.51**

While the incremental participation rate of the treatment group in other EE programs is modest when considered in total, increased uptake of measures immediately following promotional messaging within MyHER mailers could be much more dramatic. Each MyHER issued has space for one product promotion message that is used to market other Duke Energy programs

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or initiatives. Duke Energy provided Nexant with records of the exact messages received by each home. Table 3-10 and Table 3-11 show the number of homes that received each combination of messages for the DEC and DEP MyHER cycles from this evaluation period.

Table 3-10: DEC MyHER Promotional Messaging by Month

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
06/2017	Fire Up The Grill	Think Thermostat	207,609
06/2017	HEHC	Think Thermostat	291,650
06/2017	NC Greenpower	Think Thermostat	674,093
07/2017	Discover Ways To Save	Full Not Too Full	87
07/2017	Duke Energy Delivers	Full Not Too Full	1,153,123
07/2017	Safety First	Full Not Too Full	6,172
08/2017	Laundry Savings	Automate Energy Use	1,148,835
10/2017	Share The Warmth	To Preheat Or Not	1,171,806
11/2017	Great Escape	Unblock The Heat	96,953
11/2017	Weatherstrip	Unblock The Heat	447,864
12/2017	Share The Warmth	Think At The Sink	1,116,808
01/2018	Great Escape	Safety And Savings	273,800
01/2018	Let The Sun Shine	Safety And Savings	856,846
02/2018	Insulate And Seal	Caulk	428,407
02/2018	Johns Manville Ad (Intelligent)	None	44,173
02/2018	Johns Manville Ad (Traditional)	None	38,854
02/2018	Johns Manville eHER only Ad (Intelligent)	None	20,459
02/2018	Johns Manville eHER only Ad (Traditional)	None	20,267
03/2018	Equal Payment Plan	Interactive	446,161
03/2018	Power Manager 32	Interactive	443,381
03/2018	Ecobee Ad (Intelligent)	None	87,843
03/2018	Ecobee Ad (Traditional)	None	78,410
03/2018	Ecobee eHER only Ad (Intelligent)	None	20,442
03/2018	Ecobee eHER only Ad (Traditional)	None	20,329
04/2018	Find It Duke	Cool Off On Counter	425,744
04/2018	Lighting DEC Ad (Intelligent)	None	60,356
04/2018	Lighting DEC Ad (Traditional)	None	60,395
05/2018	Find It Duke	Let LEDs Lower Bills	952,111
05/2018	Online Store - May Lighting Ad A	None	99,426
05/2018	Online Store - May Lighting Ad B	None	99,070

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Table 3-11: DEP MyHER Promotional Messaging by Month

Source Month	Message 1 - Details	Message 2 - Details	Number of Homes
06/2017	Fire Up The Grill	Think Thermostat	16,901
06/2017	HEHC	Think Thermostat	527,037
06/2017	NC Greenpower	Think Thermostat	145,351
07/2017	Discover Ways To Save	Full Not Too Full	38
07/2017	Don't Forget The Bulbs	Full Not Too Full	678,448
07/2017	Safety First	Full Not Too Full	15
08/2017	Laundry Savings	Automate Energy Use	680,829
10/2017	It Takes More DEP	To Preheat Or Not	691,761
11/2017	Great Escape	Unblock The Heat	233,084
11/2017	Weatherstrip	Unblock The Heat	72,702
11/2017	Weatherstrip MF	Unblock The Heat MF	1,559
12/2017	It Takes More DEP	Think At The Sink	626,155
01/2018	Great Escape	Safety And Savings	494,476
01/2018	Let The Sun Shine	Safety And Savings	171,651
02/2018	Insulate And Seal	Caulk	196,546
02/2018	Johns Manville Ad (Intelligent)	None	23,627
02/2018	Johns Manville Ad (Traditional)	None	20,684
02/2018	Johns Manville eHER only Ad (Intelligent)	None	39,638
02/2018	Johns Manville eHER only Ad (Traditional)	None	39,871
03/2018	Energy Wise DEP	Interactive	269,480
03/2018	Equal Payment Plan	Interactive	2,417
03/2018	Equal Payment Plan DEP	Interactive	220,991
03/2018	Ecobee Ad (Intelligent)	None	39,307
03/2018	Ecobee Ad (Traditional)	None	35,126
03/2018	Ecobee eHER only Ad (Intelligent)	None	40,113
03/2018	Ecobee eHER only Ad (Traditional)	None	40,239
04/2018	Find It Duke	Cool Off On Counter	184,896
04/2018	Lighting DEP Ad (Intelligent)	None	62,604
04/2018	Lighting DEP Ad (Traditional)	None	54,374
05/2018	Find It Duke	Let LEDs Lower Bills	532,453
05/2018	Retail Lighting - May Lighting DEP Ad A	None	70,712
05/2018	Retail Lighting - May Lighting DEP Ad B	None	79,863

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3.2 Impact Findings

3.2.1 Per-home kWh and Percent Impacts

Nexant estimates the average participating DEC MyHER home saved 247.7 kWh of electricity from June 2017 to May 2018. This represents a 1.69% reduction in total electricity consumption compared to the control group over the same period. The average DEP MyHER home saved 201.2 kWh of electricity from June 2017 to May 2018, which represents a 1.25% reduction in electricity consumption. These estimates reflect an upward adjustment to account for the intention-to-treat methodology and a downward adjustment to prevent double-counting of savings attributable to incremental participation of treatment groups in Duke Energy's energy efficiency programs.

Table 3-12 and Table 3-13 show the impact estimates in each bill month for the average home assigned to treatment in DEC and DEP, respectively. The table also shows the subsequent adjustment to account for the fact that only a subset of homes assigned to treatment was actively participating in MyHER during the study period.

Table 3-12: DEC MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment

Month	Treatment Homes Analyzed	DEC Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
06/2017	1,231,705	1,197,462	8.7	97%	9.0
07/2017	1,218,640	1,198,133	3.6	98%	3.7
08/2017	1,207,107	1,171,813	4.0	97%	4.1
09/2017	1,195,242	1,172,053	14.5	98%	14.7
10/2017	1,185,902	1,172,053	15.3	99%	15.5
11/2017	1,225,916	1,195,285	27.0	98%	27.6
12/2017	1,216,916	1,191,881	36.8	98%	37.6
01/2018	1,208,915	1,193,353	30.4	99%	30.7
02/2018	1,200,827	1,178,403	30.1	98%	30.7
03/2018	1,192,681	1,177,960	31.9	99%	32.3
04/2018	1,183,803	1,157,514	26.1	98%	26.7
05/2018	1,173,821	1,151,896	20.5	98%	20.9
12-month Total			**248.9**	**98%**	**253.6**

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Table 3-13: DEP MyHER Impact Estimates with ITT Adjustment, before EE Overlap Adjustment

Month	Treatment Homes Analyzed	DEP Participant Count	kWh impact in Assigned Homes	% Treated	kWh Impact in Treated Homes
06/2017	727,455	682,040	18.3	94%	19.5
07/2017	719,693	713,994	17.2	99%	17.4
08/2017	712,653	701,172	19.5	98%	19.8
09/2017	705,487	700,125	4.1	99%	4.1
10/2017	699,920	700,125	-6.1	100%	-6.1
11/2017	726,344	710,313	19.3	98%	19.7
12/2017	720,920	707,899	31.2	98%	31.8
01/2018	715,954	708,355	29.2	99%	29.5
02/2018	711,221	697,726	21.4	98%	21.8
03/2018	706,614	698,443	15.5	99%	15.6
04/2018	701,195	693,815	16.3	99%	16.5
05/2018	695,352	689,886	17.4	99%	17.6
12-month Total			**203.3**	**98%**	**207.2**

An adjustment factor of 5.95 kWh per home for DEC and 6.02 kWh per home for DEP is applied to MyHER impact estimates in Table 3-14 to arrive at the final net verified program impact per home. Section 3.2.6 provides additional detail on the calculation of the adjustment for overlapping participation in other Duke EE programs.

Table 3-14: MyHER Impact Estimates Net of EE Overlap

Jurisdiction	Time Period	kWh Savings in Treated Homes	Incremental kWh from EE Programs	Net MyHER Impact Estimate	Control Group Usage (kWh)	Percent Reduction
DEC	June 2017 - May 2018	253.6	5.95	247.7	14,658	1.69%
DEP	June 2017 - May 2018	207.2	6.02	201.2	16,137	1.25%

3.2.2 Aggregate Impacts

The total impact of the MyHER program in each service territory is calculated by multiplying the per-home impacts (adjusted for ITT and incremental EE participation) for each bill month by the number of participating homes. Over the 12-month period June 2017 to May 2018, DEC MyHER participants conserved 292.2 GWh of electricity, while DEP MyHER participants conserved 141.1 GWh. The aggregate impacts presented in Table 3-15 and Table 3-16 are at the meter

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level so they do not reflect line losses which occur during transmission and distribution between the generator and end-use customer.

Table 3-15: DEC MyHER Aggregate Impacts

Month	DEC Participant Count	kWh Net Impact	GWh Net Impact
06/2017	1,197,462	8.5	10.2
07/2017	1,198,133	3.2	3.8
08/2017	1,171,813	3.6	4.2
09/2017	1,172,053	14.1	16.6
10/2017	1,172,053	14.8	17.4
11/2017	1,195,285	27.3	32.6
12/2017	1,191,881	37.2	44.3
01/2018	1,193,353	30.3	36.2
02/2018	1,178,403	30.2	35.6
03/2018	1,177,960	31.9	37.6
04/2018	1,157,514	26.2	30.3
05/2018	1,151,896	20.4	23.5
12-month Total		**247.7**	**292.2**

Table 3-16: DEP MyHER Aggregate Impacts

Month	DEP Participant Count	kWh Net Impact	GWh Net Impact
06/2017	682,040	19.1	13.0
07/2017	713,994	16.9	12.1
08/2017	701,172	19.3	13.6
09/2017	700,125	3.6	2.5
10/2017	700,125	-6.6	-4.6
11/2017	710,313	19.2	13.6
12/2017	707,899	31.3	22.1
01/2018	708,355	29.0	20.5
02/2018	697,726	21.3	14.9
03/2018	698,443	15.1	10.6
04/2018	693,815	16.0	11.1
05/2018	689,886	17.1	11.8
12-month Total		**201.2**	**141.1**

3.2.3 Precision of Findings

The margin of error of the per-home impact estimate is ± 16.0 kWh for DEC and ± 18.9 kWh for DEP at the 90% confidence interval. Nexant clustered the variation of the LFER model by

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Account ID to produce a robust estimate of the standard error associated with treatment coefficients. The standard normal z-statistic for the 90% confidence level of 1.645 was then used to estimate the uncertainty associated with each cohort estimate. This uncertainty was then aggregated across cohorts to quantify the precision of the program-level impacts estimates (Table 3-17 and Table 3-18).

Table 3-17: 90% Confidence Intervals Associated with DEC MyHER Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	231.7	247.7	263.6
Percent Reduction	1.58%	1.69%	1.80%
Aggregate Impact (GWh)	273.4	292.2	311.0

Table 3-18: 90% Confidence Intervals Associated with DEP MyHER Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	182.3	201.2	220.1
Percent Reduction	1.13%	1.25%	1.36%
Aggregate Impact (GWh)	127.9	141.1	154.3

For DEC, the absolute precision of the result is ± 0.11% and the relative precision of ± 6.4% at the 90% confidence level. For DEP, the absolute precision of the result is ± 0.12% and the relative precision of ± 9.4% at the 90% confidence level.

3.2.4 Impact Estimates by Cohort

The per-home impact estimates shown in Table 3-15 and Table 3-16 reflect a weighted average impact across the eight cohorts of DEC MyHER customers analyzed and the six cohorts of DEP MyHER customers analyzed. The impact estimates for the individual cohorts varied across the study period. Table 3-19 and Table 3-20 show point estimates for each cohort during the period June 2017 to May 2018 for DEC and DEP, respectively. Three released cohorts for DEC and one release cohort for DEP were added to treatment in October 2015 and began producing impacts in November 2015.

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Table 3-19: DEC Annual kWh Impact Estimates by Cohort

Month	Monthly Average Impact							
	Apr 2010	2012 - 2013	2014 - 2015	2016	2017	Apr 2010 Release	2012 - 2013 Release	2014 - 2015 Release
06/2017	-22.6	-7.0	-8.7	-7.0	-15.7	-6.4	-11.1	-10.1
07/2017	-22.0	5.0	-7.4	-5.0	-21.3	-9.6	-15.3	-8.8
08/2017	-23.5	4.5	-9.8	-3.9	-15.4	-12.6	-12.4	-13.8
09/2017	-29.4	-18.1	-11.4	-3.7	-14.6	-12.4	-10.1	-15.5
10/2017	-22.1	-13.4	-22.1	-8.5	-8.6	-10.7	-6.9	-15.6
11/2017	-19.8	-34.6	-28.3	-18.2	-12.2	-17.0	-8.4	-13.7
12/2017	-19.6	-59.9	-27.4	-23.9	-1.2	-19.0	-12.3	-18.3
01/2018	-24.9	-31.1	-45.7	-21.2	0.0	-26.9	-15.8	-23.4
02/2018	-23.5	-37.8	-33.5	-19.8	-10.3	-15.9	-11.5	-17.6
03/2018	-24.1	-39.4	-36.7	-19.5	-12.1	-20.9	-9.5	-16.4
04/2018	-20.2	-31.2	-26.7	-14.6	-21.7	-13.5	-8.3	-15.0
05/2018	-23.1	-20.8	-17.4	-11.9	-36.9	-15.2	-8.8	-19.0
12 Month Total	-274.8	-283.7	-275.0	-157.1	-169.9	-180.1	-130.3	-187.2

Table 3-20: DEP Annual kWh Impact Estimates by Cohort

Month	Monthly Average Impact					
	Dec 2014	Dec 2015	Jun 2016	May 2017	Oct 2017	Dec 2014 Release
06/2017	-22.3	-5.7	-15.3	-8.6	0.0	-3.0
07/2017	-21.0	-10.5	-19.2	-5.5	0.0	-2.6
08/2017	-24.3	-11.0	-16.2	-4.0	0.0	-4.0
09/2017	-2.8	-10.9	-16.8	-5.1	0.0	-5.8
10/2017	10.6	-5.8	-17.4	-2.7	0.0	-6.6
11/2017	-24.4	-9.1	-10.8	-8.6	10.0	-12.6
12/2017	-40.8	-18.9	-2.0	-14.8	30.2	-21.3
01/2018	-38.1	-24.4	-2.2	-13.4	32.6	-19.8
02/2018	-26.6	-8.4	-15.3	-13.0	14.9	-13.2
03/2018	-18.7	-5.4	-14.5	-9.0	11.1	-14.0
04/2018	-19.2	-1.1	-20.0	-6.4	-5.9	-12.2
05/2018	-21.1	-6.8	-22.1	-0.9	-17.9	-8.3
12 Month Total	-248.8	-118.1	-171.8	-92.1	74.9	-123.4

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For DEC, cohorts 1, 2, and 3 (April 2010, 2012 - 2013, and 2014 - 2015) show the greatest impacts and are also the oldest cohorts. Cohort 2 is the largest cohort and contains roughly 44% of analyzed treatment customers. For DEP, cohorts 1 and 3 (December 2014 and June 2016) show the greatest impacts. Cohort 1 is the largest cohort in DEP and contains about 71% of analyzed treatment customers.

Table 3-21 and Table 3-22 show the margin of error at the 90% confidence level for each cohort's annual impact estimate for DEC and DEP, respectively. The combined margin of error for the entire program is lower than the error for any single cohort because the combined program impact estimate is based on a larger pool of customers. Individual cohort margins of error are high for the small cohorts due to the sizes of these groups relative to the underlying variation in consumption among the treatment and control groups constituting each cohort.

Table 3-21: DEC 90% Confidence Intervals Associated with Cohort Savings Estimates

Cohort	Margin of Error in kWh at 90% Confidence Level		Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Apr 2010	±	194	-468	-275	-81
2012 - 2013	±	72	-356	-284	-212
2014 - 2015	±	65	-340	-275	-210
2016	±	86	-243	-157	-71
2017	±	67	-237	-170	-102
Apr 2010 Release	±	166	-346	-180	-15
2012 - 2013 Release	±	83	-213	-130	-48
2014 - 2015 Release	±	94	-281	-187	-93

Table 3-22: DEP 90% Confidence Intervals Associated with Cohort Savings Estimates

Cohort	Margin of Error in kWh at 90% Confidence Level		Lower Bound (kWh)	Point Estimate (kWh)	Upper Bound (kWh)
Dec 2014	±	49	-298	-249	-199
Dec 2015	±	148	-266	-118	30
Jun 2016	±	105	-277	-172	-67
May 2017	±	144	-236	-92	52
Oct 2017	±	70	5	75	145
Dec 2014 Release	±	67	-191	-123	-56

3.2.5 Seasonal Trends

There is a clear seasonal pattern to the DEC and DEP MyHER savings profiles. DEC and DEP customers both consistently experience the greatest reductions in winter and the smallest,

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sometimes negative, reductions in summer. The green series in Figure 3-5 and Figure 3-6 show the average estimated monthly treatment effect for the program in each bill month from May 2016 to May 2018. The blue series in Figure 3-5 and Figure 3-6 show the average control customer's load during the same period of time. Even though annual electricity consumption for customers in both service territories is clearly bimodal (with peaks in both the summer and winter), MyHER impacts are not.

Figure 3-5: DEC Average kWh Savings by Month
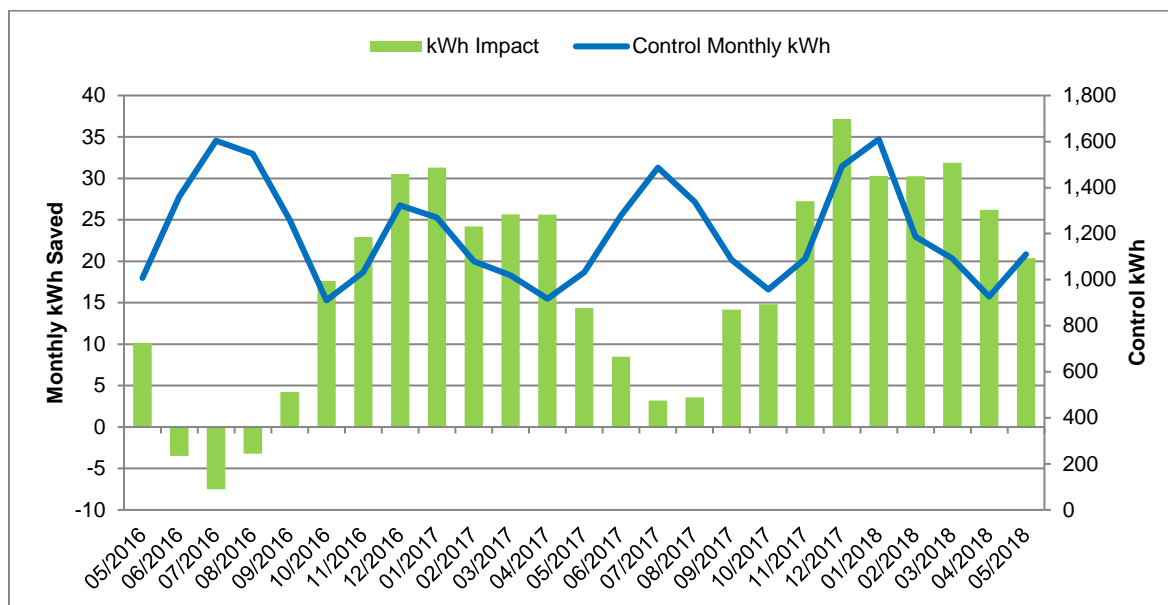
Figure 3-6: DEP Average kWh Savings by Month
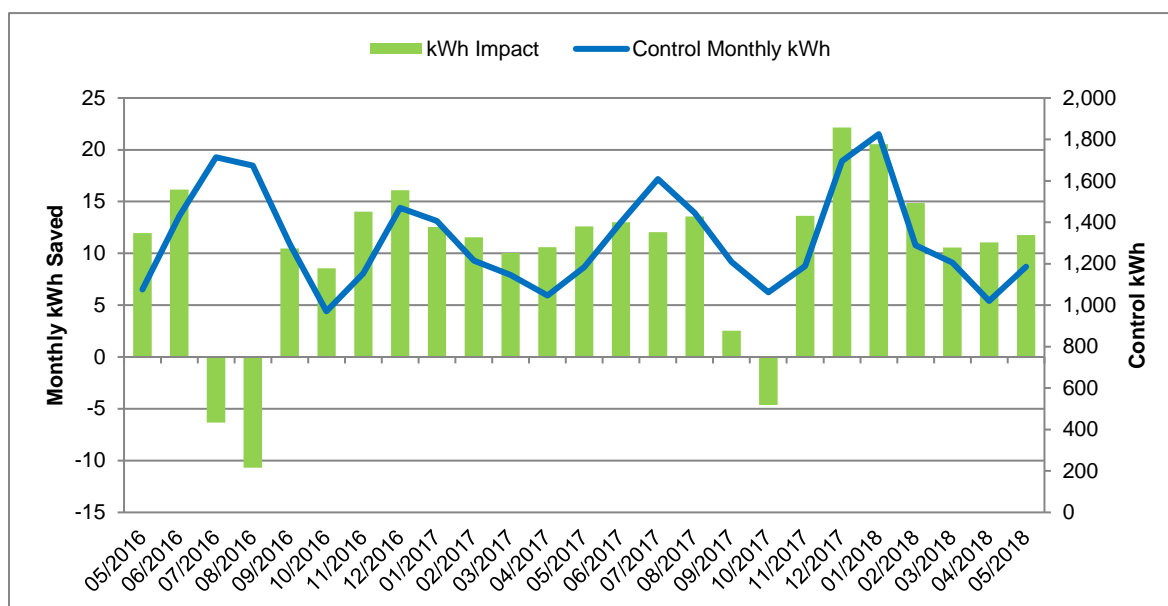
Based on the observed savings trends, MyHER is realizing the greatest impacts in the winter and shoulder months, with the lowest impacts in the summer months. Seasonal trends in

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MyHER average treatment effects likely reflect customers' differing abilities to respond by season. For example, winter heating demand can be mitigated by dressing more warmly, using more blankets in the home, or shutting off lights more often (there are fewer hours of daylight in the winter than the summer). The summer impacts still occur but the conservation options, and potentially willingness to conserve on cooling, options available to customers are fewer.

3.2.6   Uplift in Other Duke Energy Programs

Section 3.1.6 outlined the methodology Nexant used to calculate the annual kWh savings attributable to increased participation in other Duke Energy programs. Table 3-23 presents the downward adjustment per home that was applied to impacts in order to avoid double-counting savings from June 2017 to May 2018. For DEC, the uplift was determined to be 5.95 kWh per home, or 7.0 GWh in aggregate. For DEP, the uplift was determined to be 6.02 kWh per home, or 4.2 GWh in aggregate.

Table 3-23: Monthly Adjustment for Overlapping Participation in Other EE Programs

Month	DEC Incremental kWh from Other EE Programs	DEP Incremental kWh from Other EE Programs
06/2017	0.52	0.46
07/2017	0.52	0.48
08/2017	0.56	0.49
09/2017	0.60	0.53
10/2017	0.64	0.56
11/2017	0.40	0.52
12/2017	0.43	0.49
01/2018	0.45	0.49
02/2018	0.45	0.50
03/2018	0.45	0.50
04/2018	0.46	0.50
05/2018	0.46	0.50
12 Month Total	**5.95**	**6.02**

Although these additional savings must be subtracted from the MyHER effect to prevent double-counting, the MyHERs clearly played an important role in harvesting these savings.

Table 3-24 and Table 3-25 show the average daily energy savings attributable to tracked energy efficiency measures as of May 2018 by cohort and calculates an uplift percentage. In nearly every case the treatment group showed a higher propensity to adopt measures through Duke Energy programs than the control group.

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Table 3-24: DEC Uplift Percentage by Cohort

	Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
1	Apr 2010	18.7	17.7	6.2%
2	2012 - 2013	14.6	13.7	7.0%
3	2014 - 2015	15.2	14.6	3.9%
4	2016	28.1	27.3	2.9%
5	2017	18.1	19.4	-6.4%
6	Apr 2010 Release	17.9	17.7	1.6%
7	2012 - 2013 Release	14.0	13.7	2.3%
8	2014 - 2015 Release	13.8	14.6	-5.3%

Table 3-25: DEP Uplift Percentage by Cohort

	Cohort	Monthly Net kWh Savings from EE (Treatment Group)	Monthly Net kWh Savings from EE (Control Group)	Uplift Percentage
1	Dec 2014	9.3	8.7	6.76%
2	Dec 2015	9.2	8.0	13.98%
3	Jun 2016	9.8	9.1	7.64%
4	May 2017	7.8	7.8	0.14%
5	Oct 2017	6.9	7.2	-4.90%
6	Dec 2014 Release	9.1	8.7	4.93%

3.2.7 Duration of Exposure

Home energy report evaluations in North America consistently find a trend of increasing savings with length of treatment. Since the prior evaluation, Nexant has estimated impacts for three new cohorts in both service territories. The bulk of the cohorts were added to the DEC and DEP programs in June 2016, May 2017, and October 2017. In DEC, the newest cohorts (Cohorts 4 and 5) make up 15% of the treatment population by May 2018. In DEP, the newest cohorts (3, 4, and 5) make up 19% of the treatment population by May 2018. Figure 3-7 and Figure 3-8 compare the overall results with the results of the average customer who is not in one of the three newest cohorts for DEC and DEP, respectively. The older cohorts consistently realize higher impacts than their newer counterparts.

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Figure 3-7: DEC Comparison of Average Customer Savings to the Savings of the Older Program Participants
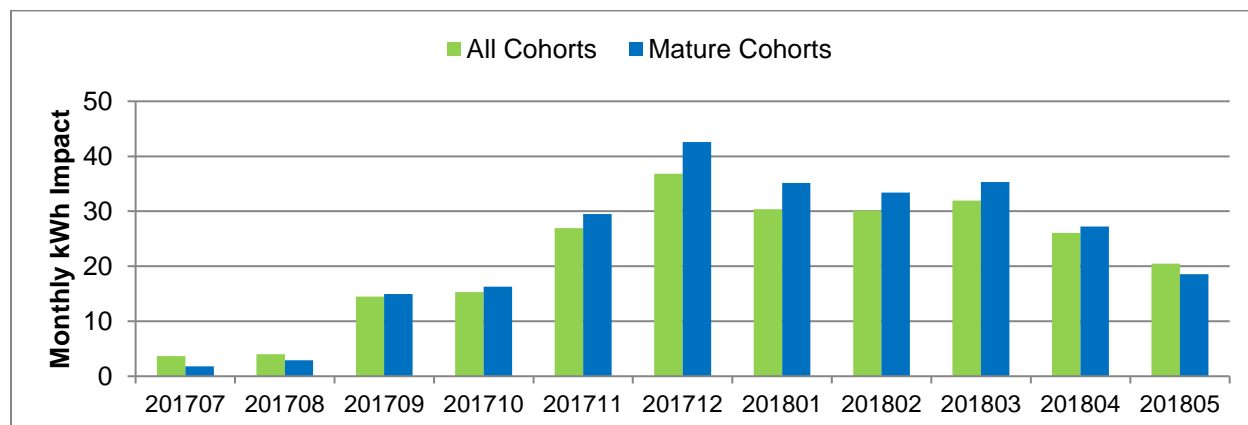
Figure 3-8: DEP Comparison of Average Customer Savings to the Savings of the Older Program Participants
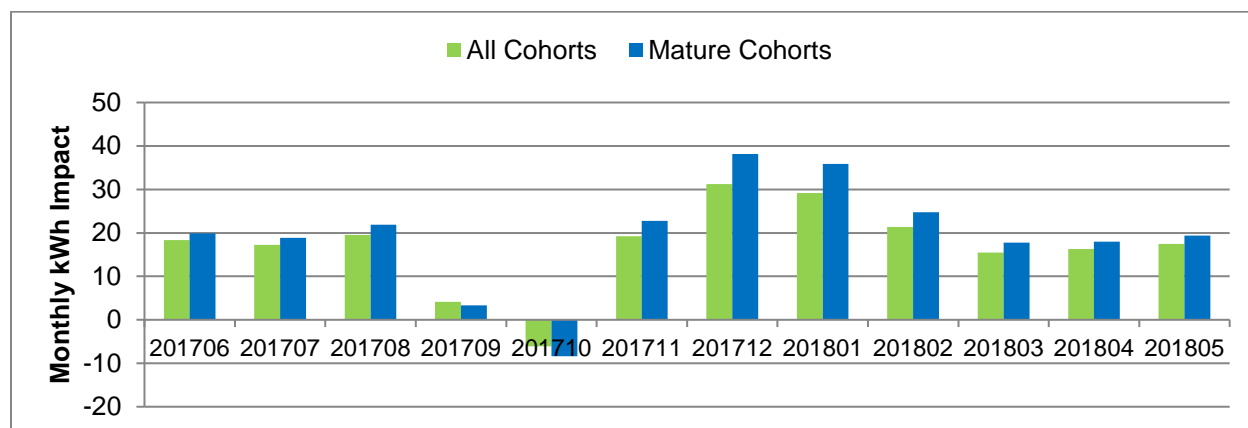
Figure 3-9 displays the annual savings by the number of years a cohort has been in the program. A general upward trend of savings occurs with longer exposure to treatment, however some exceptions are visible. The oldest cohort, which has been in treatment since 2010, shows lower impacts than those in earlier years of treatment. It should be noted that there are few program implementations of home energy report programs with durations in excess of five years and there is less information about what should be expected from implementations of that vintage. Additionally, with less than 6,000 treatment customers in this cohort, it is now one of the smallest cohorts in DEC. It is reasonable to expect the newer cohorts' impacts to increase with maturation of the cohorts, however the 2010 cohort's performance may be indicative of the existence of a point peak maturation after which mature impacts cannot be sustained. A literature review of home energy report programs in North America with participants exposed to treatment for eight years or more would be valuable to benchmark the performance of Duke Energy's oldest MyHER cohorts.

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Figure 3-9: Annual Savings by Duration of Exposure
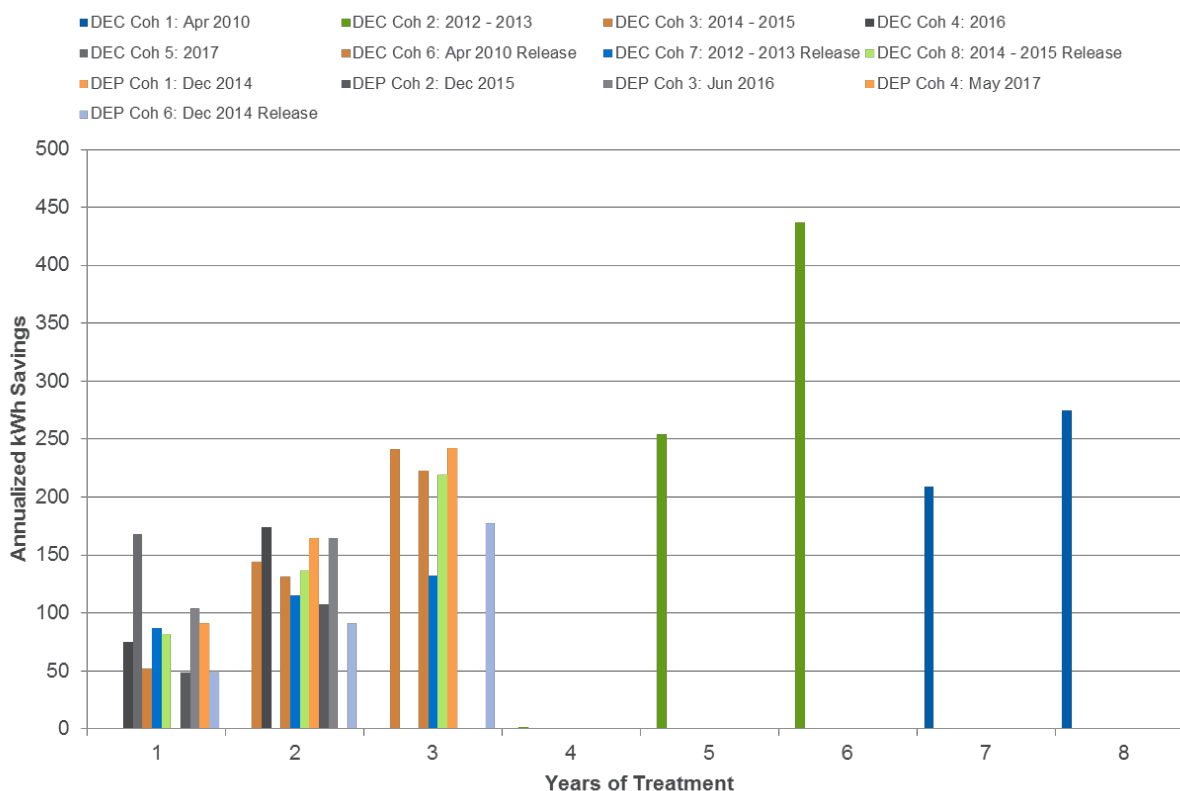
3.3 MyHER Interactive Portal

Nexant also evaluated the incremental energy savings generated by Duke Energy's enhancement to the standard MyHER report. Duke Energy launched the MyHER Interactive Portal in March 2015. The portal offers additional means for customers to customize or update Duke Energy's data on their premises, demographics, and other characteristics that affect consumption and MyHER's classification of each customer.

The portal provides additional custom tips based on updated data provided by the customer. MyHER Interactive also sends weekly email challenges that seek to engage customers in active energy management, additional efficiency upgrades, and conservation behaviors. Nexant evaluated the impacts of the MyHER Interactive Portal using a matched comparison group because MyHER Interactive is not deployed as a randomized controlled trial (RCT).

3.3.1 Estimation Procedures for MyHER Interactive

A matched comparison group is a standard approach for establishing a counterfactual baseline when there is no random assignment to treatment and control. The goal of matching estimators is to estimate impacts by matching treatment customers to similar customers that did not participate in the program. The key assumption to matched comparison approaches is that MyHER Interactive participants closely resemble non-participants, except for the fact that one of these two groups participated in the program while the other did not. When a strong comparison

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group is established, evaluators can reliably conclude that any differences observed after enrollment are due to program's stimulus. In using a matched comparison group to estimate energy savings due to exposure to MyHER Interactive, the same statistical modeling approach is used to estimate energy savings impacts as was used for estimating energy savings for the program overall (i.e., with linear fixed effects regression (LFER) estimation).

Duke Energy provided Nexant with MyHER participant enrollment information for the Interactive portal. A total of 38,190 DEC and 19,510 DEP MyHER treatment customers signed up to use the portal. For DEC, 13,523 of the 38,190 Interactive users signed into the portal more than once, and 6,880 signed in more than twice between December 2014 and May 2018. For DEP, 6,983 of the 19,510 Interactive users signed into the portal more than once, and 3,575 signed in more than twice between March 2015 and May 2018. The average DEC and DEP MyHER Interactive user has logged in to Interactive 2.6 times.

In order for the LFER regression model to generate monthly energy savings attributable to Interactive, the customer data that the regression model uses to make the estimates must use a year of exposure to MyHER reports prior to enrolling in Interactive. For DEC, 11,101 of the Interactive users (29%) had sufficient data available for the LFER analysis before their Interactive enrollment. 4,286 Interactive users (22%) in DEP had sufficient data to be included in the LFER analysis. Figure 3-10 and Figure 3-11 plot the total number of customers enrolled in MyHER Interactive as well as the subset in the analysis for each month of the 12-month period June 2017 to May 2018 for DEC and DEP, respectively.

Figure 3-10: DEC MyHER Interactive Portal Enrollment

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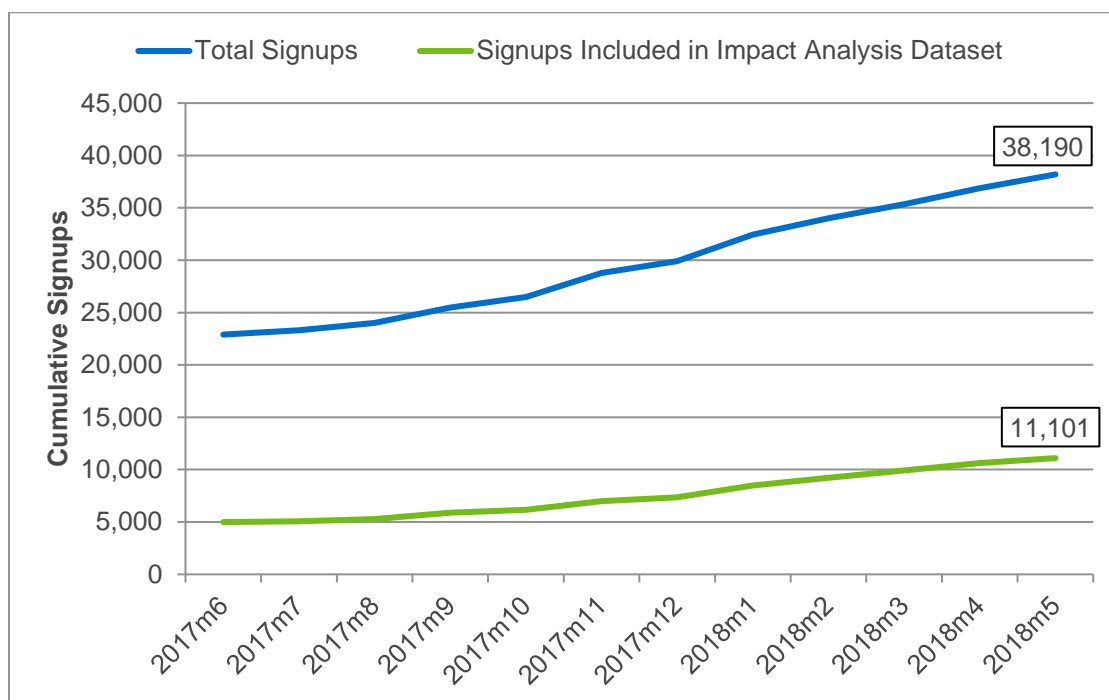
Figure 3-11: DEP MyHER Interactive Portal Enrollment
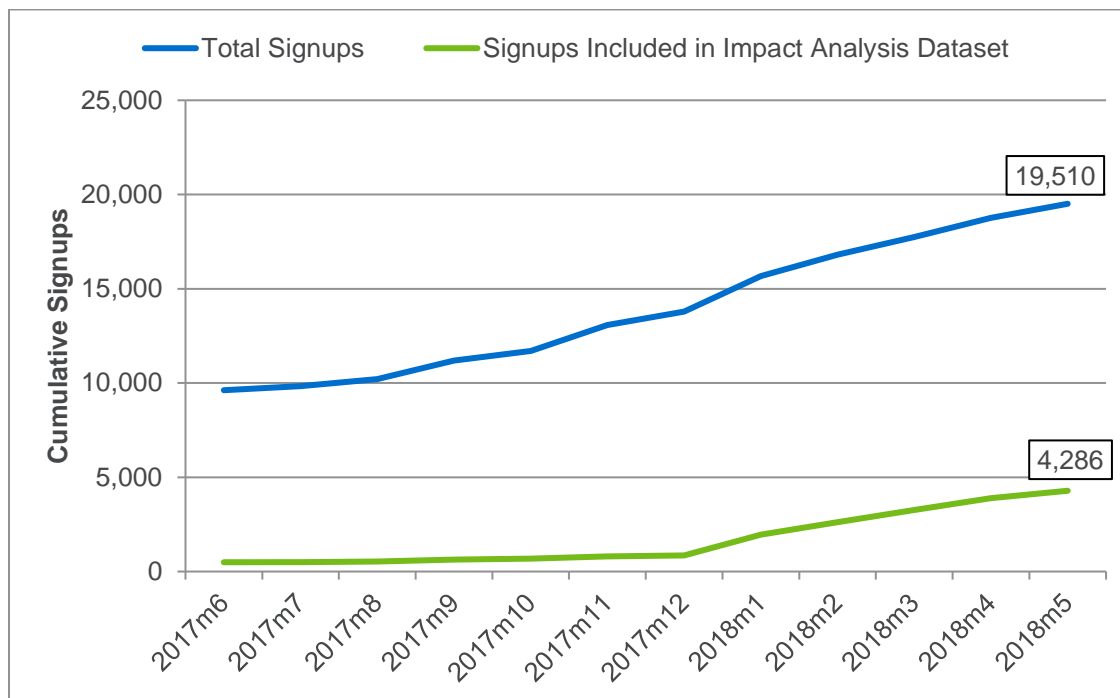
For DEC, many of the Interactive customers used in the estimation analysis were matched on their 2017 billing usage, but some customers who enrolled in Interactive at earlier points in time were matched on their 2014, 2015, or 2016 usage. Figure 3-12 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEC customers matched on 2017 usage. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEC Interactive treatment group is -0.6% for the 2014 match, 0.4% for the 2015 match, 0.1% for the 2016 match, and 0.0% for the 2017 match. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in Section 3.1.5.

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**Figure 3-12: DEC MyHER Interactive Portal Customers and Matched Comparison Group –
2017 Pre-Interactive Enrollment Periods**
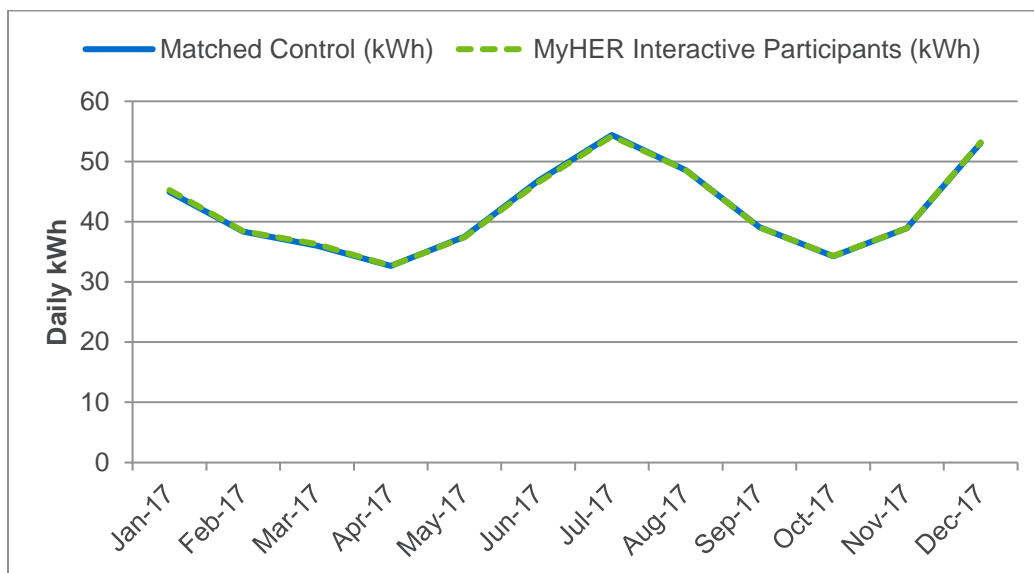
For DEP, most of the Interactive customers used in the estimation analysis were matched on their 2017 billing usage, but some customers who enrolled in Interactive earlier were matched on their 2015 or 2016 usage. Figure 3-13 presents the pre-treatment consumption for MyHER Interactive customers and a matched comparison group comprised of MyHER customers that have not enrolled in Interactive for the DEP customers matched on 2017 usage. The matching approach generates two groups with nearly identical consumption patterns over the time period prior to customers' enrollment in MyHER Interactive. On average, the difference in monthly usage between the matched control group and the DEP Interactive treatment group is 0.3% for the 2015 match, -0.2% for the 2016 match, and 0.1% for the 2017 match. The fixed effects model specification Nexant applies controls for these pre-treatment differences, as discussed earlier in Section 3.1.5.

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Figure 3-13: DEP MyHER Interactive Portal Customers and Matched Comparison Group – 2017 Pre-Interactive Enrollment Periods
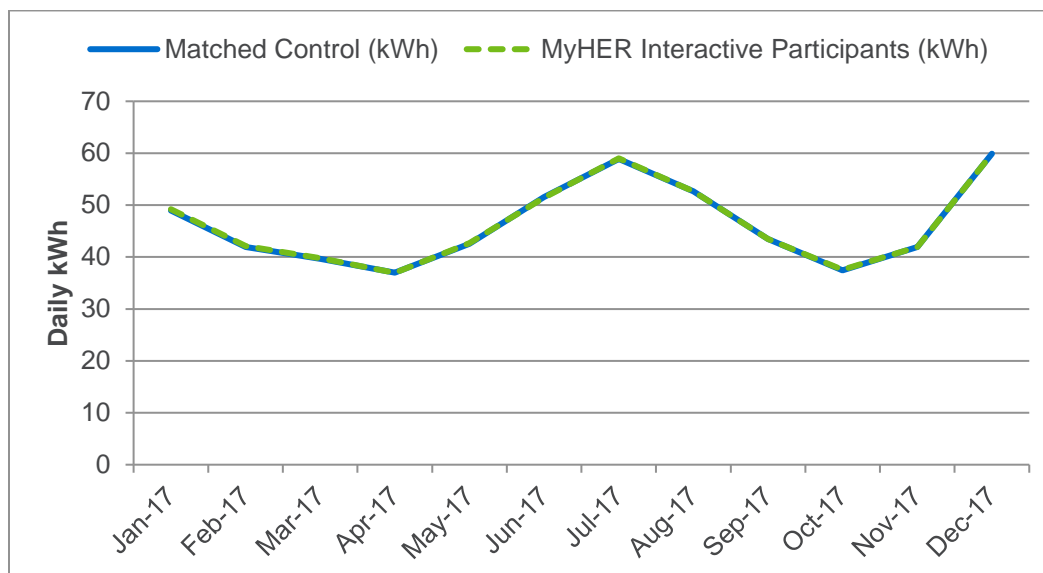
3.3.2 Results and Precision

For DEC, the average monthly impact across the 12-month period June 2017 to May 2018 was 21.3 kWh or 255.1 kWh annually per customer, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, and this impact is significant at the 90% level of confidence. In aggregate, the DEC MyHER Interactive Portal resulted in 7.38 GWh of annual savings, incremental to the MyHER reports. These high-level findings are summarized in Table 3-26.

Table 3-26: 90% Confidence Intervals Associated with DEC MyHER Interactive Impact Estimates

Parameter	Lower Bound (90%)	Point Estimate	Upper Bound (90%)
Evaluation Period Savings per Home (kWh)	41.4	255.1	468.8
Percent Reduction	0.27%	1.65%	3.02%
Aggregate Impact (GWh)	0.99	7.38	13.77

On a month-to-month basis, energy impacts were statistically significant during the months of April, May, June, August, September, October, November, and December and range from 0.6% to 2.6%, or from 9 to 36 kWh on an absolute basis.

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Figure 3-14 illustrates average monthly energy usage for the DEC MyHER Interactive users (the blue line) and the same for the matched control group (the green line), along with the estimated impact and 90% confidence band (the orange lines and orange dashed lines) by month. Also shown as blue bars are counts of Interactive sign-ups.

Figure 3-14: DEC MyHER Interactive Portal Energy Impacts
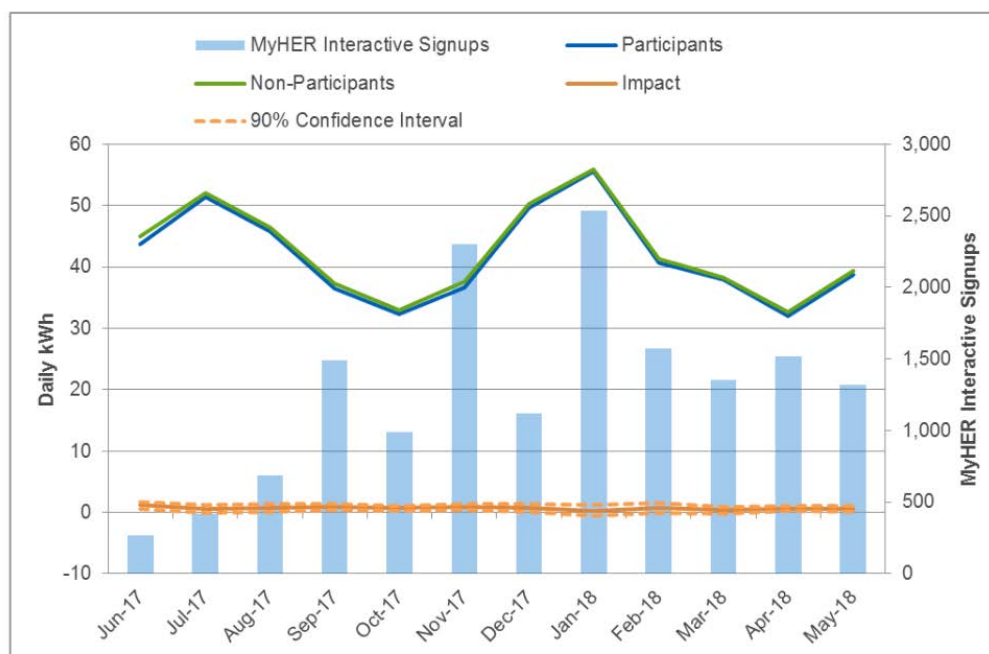
Table 3-27 provides impact model results for DEC, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence.

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Table 3-27: DEC MyHER Interactive Monthly Energy Savings

Month	Number of Participants Analyzed	MyHER Interactive Signups	Daily kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Jun-17	4,993	270	44.9	43.8	1.2	0.6	1.8	2.6%	*
Jul-17	5,075	420	52.1	51.5	0.6	0.0	1.3	1.2%	
Aug-17	5,288	684	46.5	45.7	0.7	0.1	1.3	1.6%	*
Sep-17	5,880	1,490	37.3	36.5	0.9	0.4	1.3	2.3%	*
Oct-17	6,157	990	33.0	32.4	0.7	0.3	1.1	2.0%	*
Nov-17	6,976	2,301	37.6	36.7	0.9	0.5	1.4	2.5%	*
Dec-17	7,356	1,119	50.3	49.6	0.7	0.1	1.4	1.5%	*
Jan-18	8,491	2,537	56.0	55.6	0.3	-0.6	1.2	0.6%	
Feb-18	9,219	1,571	41.3	40.7	0.7	-0.1	1.5	1.6%	
Mar-18	9,910	1,351	38.3	37.9	0.4	-0.2	1.0	1.0%	
Apr-18	10,628	1,515	32.7	32.1	0.6	0.2	1.1	2.0%	*
May-18	11,101	1,316	39.4	38.8	0.6	0.1	1.1	1.6%	*
Average	**7,590**	**1,297**	**42.5**	**41.8**	**0.7**	**0.5**	**0.9**	**1.6%**	*

For DEP, the average monthly impact across the 12-month period June 2017 to May 2018 was 8.7 kWh, representing the uplift in savings that MyHER Interactive produces over and above the savings produced by the paper MyHER, but this estimate is not statistically significant at the 90% level of confidence. On a month-to-month basis, energy impacts were statistically significant only during June, which represented an impact of 4.2%, or 60 kWh on an absolute basis.

Figure 3-15 illustrates average monthly energy usage for the DEP MyHER Interactive users (the blue line) and the same for the matched control group (the green line), along with the estimated impact and 90% confidence band (the orange lines and orange dashed lines) by month. Also shown as blue bars are counts of Interactive sign-ups.

Table 3-28 provides impact model results for DEP, along with the margin of error for estimated impacts. The column at the right side of the table shows asterisks for those months where the energy savings are statistically significant at the 90% level of confidence. Impacts for DEP were only significant for June 2016, but not for the remaining months or for the year June 2017 through May 2018 overall.

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Figure 3-15: DEP MyHER Interactive Portal Energy Impacts
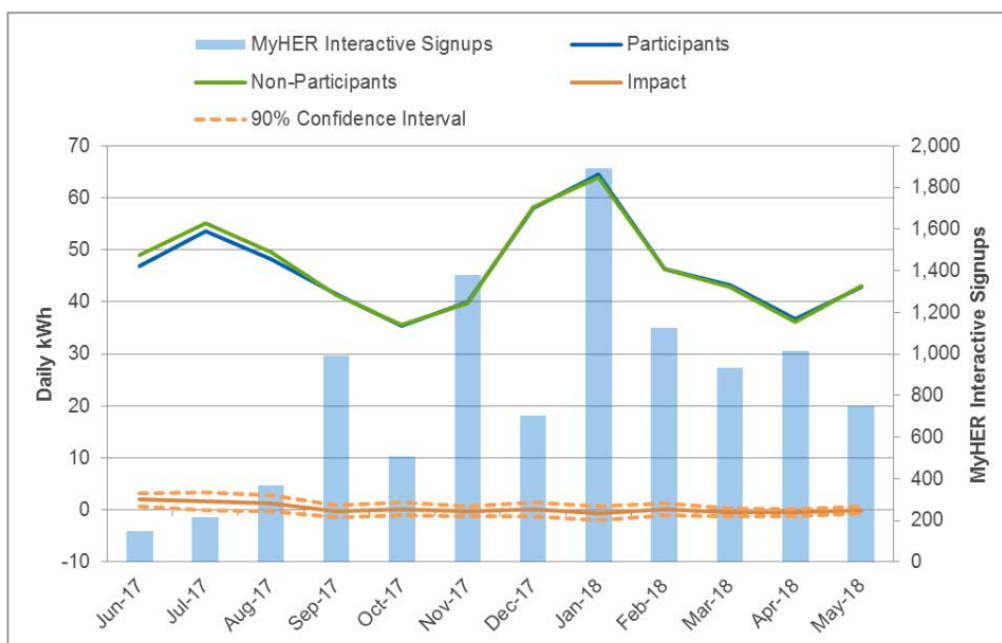
Table 3-28: DEP MyHER Interactive Monthly Energy Savings

Month	Number of Participants Analyzed	MyHER Interactive Signups	Daily kWh			90% Conf. Interval		% Impact	
			Non-Participants	Participants	Impact				
Jun-17	494	150	48.9	46.9	2.0	0.8	3.3	4.2%	*
Jul-17	505	213	55.2	53.5	1.6	-0.1	3.4	3.0%	
Aug-17	535	369	49.6	48.3	1.3	-0.2	2.8	2.6%	
Sep-17	631	992	41.3	41.5	-0.2	-1.3	0.9	-0.5%	
Oct-17	677	508	35.6	35.5	0.2	-1.1	1.4	0.5%	
Nov-17	800	1,381	39.8	40.0	-0.2	-1.2	0.8	-0.5%	
Dec-17	853	703	58.2	58.1	0.2	-1.2	1.5	0.3%	
Jan-18	1,960	1,894	63.9	64.5	-0.6	-2.0	0.7	-1.0%	
Feb-18	2,625	1,127	46.3	46.2	0.1	-1.1	1.2	0.2%	
Mar-18	3,262	934	42.8	43.3	-0.4	-1.2	0.3	-1.0%	
Apr-18	3,900	1,015	36.3	36.8	-0.5	-1.1	0.1	-1.4%	
May-18	4,286	754	43.0	43.0	0.0	-0.6	0.7	0.0%	
Average	**1,711**	**837**	**46.7**	**46.5**	**0.3**	**-0.6**	**1.1**	**0.6%**	

Nexant concludes that the DEC MyHER Interactive portal succeeded in generating additional statistically significant savings during much of the evaluation period from June 2017 to May

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2018. The DEP MyHER Interactive portal only achieved additional statistically significant savings in the evaluation period during June 2017.

3.4 Impact Conclusions and Recommendations

Nexant's impact evaluation shows that Duke Energy's MyHER program continues to trigger a reduction in electric consumption among homes exposed to the program messaging.

MyHER programs also demonstrate an apparent maturation effect, typically on the order of 1-2 years. If Duke Energy continues to consistently introduce new cohorts to the program, program management should generally expect the newest cohorts to underperform relative to the established cohorts. Currently, 15% of DEC and 19% of DEP program participants should be considered as not fully mature.

Additionally, the findings from this evaluation suggest that savings of fully mature cohorts may eventually plateau or degrade over time – the oldest DEC cohort is in its 8th year on the program and displays impacts comparable to other cohorts that are in their second or third year on the program.

We find that MyHER also causes an uplift in participation in other energy efficiency programs. We have deducted the energy savings associated with that uplift so that Duke Energy does not claim the delivery of energy reductions associated with that uplift twice – those energy savings have already been claimed by those energy efficiency programs. This uplift in energy efficiency program participation means that MyHER is delivering on its secondary goal to encourage participation in other programs. We also find that the Interactive web portal has begun to show statistically significant energy savings in DEC, but not yet in DEP.

Nexant provides the following recommendations for Duke Energy's consideration:

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective statuses in a single billing month, to the extent that is technically feasible.

- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.

- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.

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4 Process Evaluation

This section presents the results of process evaluation activities including in-depth interviews with Duke Energy and implementation staff and surveys of control and treatment households.

4.1 Methods

Process evaluations support continuous program improvement by identifying opportunities to improve the effectiveness and efficiency of program operations and services. Process evaluations also identify successful program components that should be enhanced or replicated. Process evaluation activities for MyHER sought to document program operational processes and to understand the experience of those receiving MyHER mailings. The customer survey given to MyHER recipients focused on investigating the recall and influence of MyHER messages among recipients, the extent to which MyHER affects customer engagement and satisfaction with Duke Energy, their use of MyHER Interactive, and subsequent actions taken by participants to reduce household energy consumption. A survey of control group households provided a point of comparison for estimating the effect of MyHER on behavior and attitudes of treatment households.

4.1.1 Data Collection and Sampling Plan

The process evaluation included two primary data collection activities: in-depth interviews with program management and implementation staff, and surveys of a random sample of households selected to receive MyHER reports as well as surveys of a random sample of control group households.

Nexant deployed the household surveys using a mixed-mode survey measurement protocol, the activities associated with which are summarized in Table 4-1 and Table 4-2. In this protocol, customers were contacted by letter on Duke Energy stationery (to assure recipients of the legitimacy of the survey) asking them to go online and complete the survey. The letter contained a two-dollar bill as a cost-effective measure to maximize the survey completion rates. The letter also included a personalized URL for the online survey that points the recipient to a unique location on the internet at which they were able to complete the survey. Customers for whom email addresses were available also received an email inviting them to take the survey online, which also included the same personalized URL that appeared in the letter leading to the survey website at the location where they could complete it. After two weeks, customers who did not respond to the web survey received another letter, this time containing a paper copy of the survey and a return postage-paid envelope asking them to complete the survey by mail. Survey recipients also had the option of calling a toll-free telephone number to complete the survey by telephone. Table 4-1 shows that 337[8] DEC treatment customers and 211 DEC control customers completed the survey, totaling 548 responses from DEC recipients. Two samples of

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[8] 337 total DEC treatment respondents is the sum of 153 and 184 DEC completes by treatment sample.

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treatment customers were used to accommodate an expanded set of questions used for comparison with control customers. A treatment-only survey was sent to a second sample of treatment customers that only contained questions specific to the MyHER experience. This approach to using a second treatment-only instrument was taken to prevent the treatment version of the survey from becoming too long. Among the 337 DEC treatment customers that completed the survey, 153 were in the sample that received the treatment-only survey and 184 were in the sample that received the primary instrument designed to compare the responses of treatment and control customers. A total of 211 DEC control customers completed the survey. By state, 420 DEC respondents are located in North Carolina and 128 DEC respondents are located in South Carolina.

Table 4-1: Summary of Process Evaluation Activities - DEC

Population	Approach	Population	Sample		Confidence/Precision	
			Expected	Actual	Expected	Actual
Program management and implementation	In-depth interviews	~10	2-5	4	Not Applicable	Not Applicable
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	~1.4 M	188	153	90/6	90/6.7
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone	~1.4 M	188	184	90/6	90/6.0
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	~133,000	188	211	90/6	90/5.7
Total Responses			**564**	**548**		

Table 4-2 shows that a total of 539 DEP customers responded to the survey. The DEP survey design was identical to that of DEC, with two treatment samples receiving surveys; one sample received surveys with only treatment-related questions, and the other sample of treatment customers received another survey with questions designed to compare the responses of treatment and control customers. A total of 192 DEP control customers completed the survey, while 171 DEP treatment customers completed the treatment-only survey, and 176 DEP treatment customers completed the primary comparison survey. By state, 473 DEP respondents reside in North Carolina and 29 DEP respondents reside in South Carolina.

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Table 4-2: Summary of Process Evaluation Activities - DEP

Population	Approach	Population	Sample Expected	Sample Actual	Confidence/Precision Expected	Confidence/Precision Actual
Program management and implementation	In-depth interviews	~10	2-5	4	Not Applicable	Not Applicable
Treatment group households; Treatment only instrument	Mixed-mode; mail, web, and phone	~842,000	186	171	90/06	90/6.3
Treatment group households; Primary instrument	Mixed-mode; mail, web, and phone	~842,000	186	176	90/06	90/6.2
Control group households; Primary instrument	Mixed-mode; mail, web, and phone	~117,000	186	192	90/06	90/5.9
Total Responses			**558**	**539**		

Nexant's survey instruments included demographic questions to support comparisons of the treatment and control respondents as well as to support overall comparisons to the jurisdiction's territory. We present summaries of the responses to the demographic questions in Section 4.2, after the summaries of the responses to the survey questions on customer attitudes, energy usage behaviors, energy-savings actions and purchases/investments, and experience with the MyHER program.

4.1.1.1 Interviews

Nexant conducted interviews with key contacts at Duke Energy and Tendril. The interviews built upon information obtained during previous evaluations of the Duke Energy MyHER program in multiple jurisdictions. The central objectives of the interviews were to understand program operations and the main activities required to develop and distribute the MyHER reports to DEP and DEC customers, as well as to understand any developments or enhancements in program delivery.

4.1.1.2 Household Surveys

Both treatment and control groups were surveyed. Treatment households were surveyed as two groups that received different surveys: The first group's survey included questions about the respondents' experience of the reports themselves as well as questions to assess engagement and understanding of household energy use, awareness of Duke Energy efficiency program offers, and satisfaction with the services Duke Energy provides to help households manage

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their energy use. The second treatment group and control group surveys were identical, and excluded questions about the information and utility of the MyHER reports, but included identical questions on the other aspects to facilitate comparison with each other, as well as to the first treatment group.

Nexant analyzed the survey results to identify differences between treatment and control group households on the following:

- Reported levels of stated intention for future action;
- Levels of awareness of and interest in household energy use;
- The level of behavioral action or equipment-based upgrades;
- Satisfaction with Duke Energy communications, service, and efficiency options;
- Barriers to energy saving behaviors and purchases; and
- Inclination to seek information on managing household energy use from Duke Energy.

This survey approach is consistent with the RCT design of the program and supports both the impact and process evaluation activities by providing additional insight into potential program effects.

Survey Disposition - DEC

We mailed 553 letters to randomly selected residential customers in the treatment group and 553 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 553 letters to the treatment customers for the treatment-only survey. The surveys were completed by a total of 337 treatment households (across both surveys) and 211 control households, representing a an overall treatment group response rate of 30% for DEC and a control group response rate of 38%. More than half (69% of the treatment group and 66% of the control group) of the surveys were completed online. Table 4-3 summarizes the treatment and control group survey dispositions in DEC.

Table 4-3: Survey Disposition - DEC

Mode	Treatment		Control	
	Count	Percent	Count	Percent
Completes by Mode				
Web-based Survey	232	69%	140	66%
Mail/Paper Survey	88	26%	58	27%
Inbound Phone Survey	17	5%	13	6%
Total Completes	**337**	**100%**	**211**	**100%**

Table 4-4 presents DEC response rates by state. Higher response rates are observed in both North and South Carolina for control customers relative to treatment customers. In North Carolina, 30% of treatment customers invited to take the survey completed it, as compared to a

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36% response rate for control customers in North Carolina. South Carolina response rates were a bit higher: 31% of treatment customers in South Carolina and 45% of control customers in South Carolina completed the survey.

Table 4-4: Response Rates by State and Treatment Condition - DEC

State	Treatment			Control		
	Sampled	Completed	Response Rate	Sampled	Completed	Response Rate
North Carolina	866	262	30%	435	158	36%
South Carolina	240	75	31%	118	53	45%
Total	**1,106**	**337**	**30%**	**553**	**211**	**38%**

Survey Disposition - DEP

We mailed 552 letters to randomly selected residential customers in the treatment group and 552 letters to the randomly selected residential customers in the control group for the primary survey. We also mailed 552 letters to the treatment customers for the treatment-only survey. The surveys were completed by 347 treatment households (across both surveys) and 192 control households, representing a treatment group response rate of 31% and a control group response rate of 35%. More than half (63% of the treatment group and 61% of the control group) of the DEP surveys were completed online. Table 4-5 outlines the treatment and control group survey dispositions in DEP.

Table 4-5: Survey Disposition - DEP

Mode	Treatment		Control	
	Count	Percent	Count	Percent
Completes by Mode				
Web-based Survey	220	63%	117	61%
Mail/Paper Survey	104	30%	67	35%
Inbound Phone Survey	23	7%	8	4%
Total Completes	**347**	**100%**	**192**	**100%**

Table 4-6 summarizes DEP response rates by state and treatment condition. In North Carolina, 32% of treatment customers invited to take the survey completed it, as compared to a 35% response rate for control customers in North Carolina. South Carolina DEP response rates were on the whole a bit lower: 29% of treatment customers in South Carolina and 32% of control customers in South Carolina completed the survey.

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Table 4-6: Response Rates by State and Treatment Condition - DEP

State	Treatment			Control		
	Sampled	Completed	Response Rate	Sampled	Completed	Response Rate
North Carolina	976	310	32%	462	163	35%
South Carolina	128	37	29%	90	29	32%
Total	**1,104**	**347**	**31%**	**552**	**192**	**35%**

4.2 Findings

This section presents the findings from in-depth interviews with staff and implementation contractors and the results of the customer surveys.

4.2.1 Program Processes and Operations

As in other Duke Energy jurisdictions, MyHER at DEP and DEC is managed primarily through a core team of three Duke Energy staff members: a Manager of Behavioral Programs with oversight of residential behavioral programs, a Program Manager in charge of the day-to-day operations of the MyHER program, and a Data Analyst that is responsible for the substantial data tracking and cleaning tasks required to support the contracted implementation team, as well as internal program reporting to Duke Energy management.

At Tendril, Duke Energy's contracted program implementer, MyHER is supported by a team of people including an Operations Manager, a Home Energy Report Product Manager, an Engineering Manager, a dedicated Operations Engineer, a Quality Control Engineer, an "Ask-the-Expert" technical writer, and an Account Manager responsible for ensuring that the Duke Energy MyHER products meet expectations for quality, timing, and customer satisfaction. Tendril staff track the number of reports sent, the quality of the reports, and the timing of when reports are mailed. Tendril's key performance indicators (KPIs) include in-home dates for each batch as well as the percentage of treatment customers actually treated.

MyHER is Duke Energy's flagship behavioral energy efficiency program. Its primary goals are to achieve energy savings, increase customer satisfaction, and cross-promote enrollment into Duke Energy's demand response and energy efficiency programs. Staff at both organizations described continuous, close coordination to ensure that the data behind the MyHER comparisons are accurate, the tips provided to specific households are appropriate, and that MyHERs are delivered as soon as possible after billing data is received, within the relatively short timeframe between bills.

Program operations are conducted with a customer-focused orientation where the commitment to producing a high-quality product is a demanding process that must be executed consistently each month of the year.

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4.2.1.1 MyHER Production

During the period of time under study by this evaluation, MyHERs were mailed out to DEP and DEC customers on paper through the U.S. Mail service about eight times a year, where the mailing gaps generally occurred in January, April, September, and December. During the eight U.S. Mail treatment months, the reports are generated twice per week, a cadence that is designed to facilitate meeting one of Tendril's key performance indicators: that MyHERs arrive at the customers' homes at the cycle's mid-point (though, ideally, as soon as possible after the bill), so as to make the information presentment as useful and timely as possible. Additionally, any customer that has provided Duke Energy with their email address also receives their report by email, and in fact, MyHER reports are generated and emailed to those customers monthly, 12 times a year, while they continue to receive paper reports 8 times a year.[9]

The production process for any given treatment month begins as soon as meter reads for the first billing cycle are processed by Duke Energy's meter data management system. After processing, billing data is uploaded each afternoon, five times a week, to Tendril. Once the data has been received, production proceeds according to the following process, twice a week[10]: Tendril runs report production and conducts quality control checks. Then a flat file containing all the data from the reports in addition to drafts of every report (in PDF format) are sent to Duke Energy for an independent quality control check. Upon approval, Tendril then sends the PDFs to the printhouse, and the printhouse generates a final proof for Duke Energy approval. Finally, after the proof is approved, the printhouse prints and mails all the reports, Tendril emails eHERs on the specified day, and then commences the process of reporting the printing, mailing, and emailing to Duke Energy. There have been issues, however, in the iterative process of reconciling customer email addresses between Duke Energy and Tendril that has resulted in the loss of updated customer emails. There is interest in automating the email update process, but in the meantime in order to avoid further problems, Duke Energy is simply sending Tendril updates quarterly.

This production chain moves quickly: once Tendril generates a batch of reports, the time elapsed until transfer to the printhouse is generally 3-4 hours when all processes are completed according to plan. This timeframe has become the norm, but when quality control problems emerge, that elapsed time can increase significantly. Considering that the printhouse has one week to complete the mailing, and Standard Rate postage can take another week to deliver, making the mid-cycle in-home delivery goal something that takes dedicated effort to achieve.

Prior MyHER process evaluations in other Duke Energy jurisdictions where MyHER is also implemented found that this fast-moving process has seen improvements over time through the adoption of various changes: recently, these have been best characterized by an increased attention to developing procedures and schedules for a number of elements of the MyHER production process. These elements include the Duke Energy product request list, new quality

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[9] Duke Energy will cease delivery of paper MyHER reports, and only send email reports, if the customer requests them to do so.

[10] During the months where only eHERs are produced, reports are generated in one batch per week, rather than two.

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control processes at Tendril, and free form text (FFT) content development, as examples. These changes continue to deliver improvements in the number of problems found during report batch quality control checks, though Tendril continues to have some difficulty dealing with last minute requests from Duke Energy. Additionally, Tendril has implemented a number of back office process enhancements in the past year, such as migrating their computational platform to Amazon Web Services (AWS), providing a pre-promotion (i.e., draft) platform to enable Duke Energy staff to review draft PDF reports prior to promoting or finalizing them, and converting their email HER reports to Hypertext Markup Language (HTML) format which provides greater responsiveness and flexibility to Tendril operational staff.

4.2.1.2 Quality Control

Embedded in the early days of this production cycle is a quality control process that is undertaken to ensure that the reports contain accurate information and are of high quality. Duke Energy analyzes a dataset containing all of the information presented in the reports for each production cycle. This data is checked for essentially anything that could be erroneous, ranging from verifying that all the customers receiving reports are eligible to receive them, that no control customers are getting reports, that the reported electricity usage is correct, that no customers who have opted-out are getting reports, and that no one has gotten more than one report a month. Duke Energy also checks for unexpected cluster assignment changes, presentment of messaging and tips and overall print quality.

In the past, these checks have proven to be crucial as they occasionally revealed significant production problems, which were subsequently reviewed in Tendril's governance sessions with Duke Energy. This visibility has typically resulted in issue resolution on a going-forward basis.

Both Duke Energy and Tendril staff report that the incidence of significant production problems has also been dramatically reduced since Tendril implemented quality control automation. Issues that surfaced during this evaluation period were small in scope, and infrequent. In 6 months, roughly 20 incidents were identified by Duke Energy that required Tendril to remove errors it had missed in their initial round of quality control. Tendril's automated quality control process is described as follows, recalling that customer data is transferred to Tendril daily:

- Tendril pulls the Duke Energy billing data into a database (Amazon Redshift; part of the AWS suite) and organizes it in a way that allows it to be fed into the HERs. The HERs are then generated and rendered;

- The QC protocol, which is a set of SQL queries against the data, then runs. This process produces output (presented in Amazon S3; another part of the AWS suite) that reports the results of the checks, indicating the reports that were incorrectly created. Postfiltering is then done for the incorrect reports;

- Tendril staff execute visual checks to be sure nothing noticeable or significant has slipped through to final report presentment; and

- An approved file is then sent to Duke Energy, along with about 100 samples of both paper and electronic HERs.

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This automated process has the added benefit of being able to be managed by one person, which has significantly reduced the problems that the "all hands on deck" approach to executing report production and quality control presented in the past.

Prior evaluations of MyHER revealed that some program processes could benefit from improved quality control performance. Improved quality control in these areas can reduce the risk associated with running a program with processes that too often fail quality control checks. Such issues present timing risks (reports may not be sent out on time), customer service risk (reports may be sent out with problems if problems someday are missed), and risk to the overall success of the program (if the QC process is overburdened with detecting too many problems, it can become an overly-leveraged component of program operations). Interviews for this evaluation revealed continued improvement since the prior DEC and DEP evaluations in terms of frequency and significance of issues detected by Duke Energy's quality control processes.

Tendril is currently implementing a new production platform, the Home Energy Reporting Service (HOMERS), that will allow for the production of reports for multiple billing cycles at once, which will dramatically improve the production process by, notably, eliminating what are referred to as "Batch 1" problems, which are related to the relatively large number of reports produced for the first cycle of the month. Data transfers to Duke will contain much smaller and consistent batch sizes. Additionally, this new platform allows for the continuous importation of customer usage data and production of reports. This will make preventing problems easier because it allows the QC software to be programmed in a way that can verify the proper execution of customer segmentation protocols, as well as larger scale descriptive analyses at a frequency chosen by Tendril, as opposed to having to wait for the entire batch run, as is the case with the legacy system. The development of this new platform is currently near completion at Tendril, and is expected to not only detect emergent problems, but also help prevent detected errors from recurring.

The improvements described above are likely a function of the continuation of Duke Energy and Tendril's collaborative activities for program success. Duke Energy and Tendril staff join for weekly status meetings, monthly operations meetings, and quarterly governance meetings. These meetings provide a venue for shared brainstorming and roadmapping activities and the ongoing maintenance of a product request list for Tendril. Tendril has additionally commissioned an internal HER Improvement Team with the mandate to make consistent progress on the product request list. This team meets quarterly to reassess the feasibility of each of the list's items (currently numbering about 25) and reprioritize these items, as needed, based on the priorities Duke Energy has expressed in collaborative meetings. Making progress on this list, for which Tendril produces quarterly reports, has been made a priority by Duke Energy and has resulted in the above described attention in meetings. In general, this prioritization has resulted in 3 items on this list being accomplished in the last quarter.

Duke Energy and Tendril staff have recognized in prior evaluations of Duke Energy's MyHER program in other jurisdictions, as well as this one, that production problems, when they occur, usually occur following changes to the report or report cycle process. However, our interviewees

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also recognized that a strength of Tendril lies in their willingness to dive deep into details and processes to solve problems that may only affect a relatively few number of customers, and to go the extra mile to help address problems that in fact may have originated on the Duke Energy side. Interviews for this evaluation additionally reveal that the Tendril operations team has stabilized in terms of staffing, and that Tendril has added a quality control engineer to program staff. Tendril has also implemented a "Batch 0" strategy where the first batch of reports following any changes to the report is produced not for distribution, but only for quality control purposes, which is reviewed prior to the production of any live batches of reports. This procedural innovation allows Tendril to support Duke Energy's interest in fine-tuning any new features or changes to reports and to facilitate early detection of unexpected problems. Generally, both Duke Energy and Tendril staff continue to speak highly of the collaborative partnership shared by Duke Energy and Tendril in running the MyHER program and of the open lines of communication that exist and function very well at all levels of program and corporate management.

4.2.1.3 MyHER Components

MyHER reports include several key elements that are customized each month: bar charts, tips, a trend chart, and messages. Duke Energy and Tendril implemented a general refresh of the MyHER report template in 2017, designed to improve readability and to keep the presentation fresh in the eyes of recipients. Graphics were updated and images were added to some modules (described below) that were previously text-only. A new module (also described below) was added that presents usage disaggregated by end use type. Overall, recipient response to this redesign was positive, though program staff did note some difficulty recipients had with interpreting the disaggregated end use presentation.

The front page includes two bar chart graphics. The first chart is a vertical bar chart (stylized in the shape of homes) comparing the subject home to the average and most efficient homes for an assigned cluster or "neighborhood" of similar homes. Previously, in Duke Energy jurisdictions with the earliest MyHER program implementations, these graphs were labeled with dollars, but this occasionally caused confusion among recipients if the dollar amount didn't exactly match their recall of a recent bill. In March 2013, Duke Energy shifted to using kWh as the unit of measurement for the bar charts; Duke Energy conducted customer focus groups in an effort to understand the level of confusion this shift might cause and found that customers reported not paying attention to unit of measurement: they were simply absorbing the shape and directionality of the bar charts (Figure 4-1).

An infographic beneath the bar charts provides the size of the group of comparison homes, the assumed heating type, the approximate square footage, and the approximate age of the similar homes to which the customer's home is being compared. According to MyHER staff, a common reason for customer phone calls relating to MyHERs is simply the customer's desire to correct assumed information about a given home. For example, the MyHER could indicate that Duke Energy assumes a home has electric heat when it does not, or has assigned a home to the wrong size category. Any corrections provided in this manner are considered highly reliable and are not changed based on subsequent uploads of third party data.

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To the right of the vertical bar chart is a horizontal bar chart that illustrates Tendril's forecast for subject home's electricity usage in the next month, disaggregated by end use type. This chart is intended to provide actionable insights to each customer as to where they might direct their energy savings efforts to make the greatest impact in their energy usage in the month ahead. Tendril staff continues to fine-tune the disaggregation in these forecasts, as a response to customer concerns about the accuracy of this component of the report. To help improve their accuracy, Duke Energy and Tendril continue to push customers to the Interactive portal where they are able to further customize or correct information about their homes that may impact the accuracy of the disaggregated usage forecasts.

Figure 4-1: MyHER Electricity Usage Comparison and Forecasted Energy Use Bar Charts
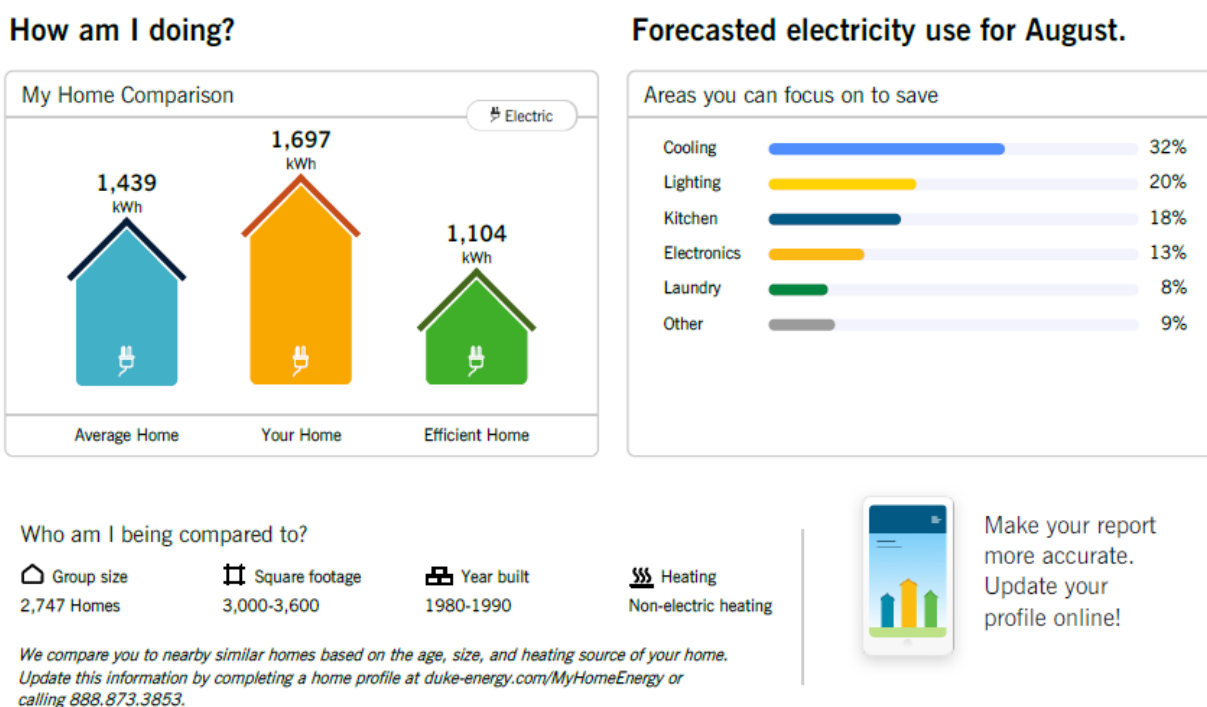
In addition to the comparison graph, each MyHER includes a set of customized action tips under the heading "How can I save more?" (Figure 4-2).These tips are designed to provide information relevant to homes with similar characteristics, as presented in the box accompanying the comparison graph. These tips often are presented with monetary values (appropriately scaled to each customer receiving the tip) that estimate the bill savings that the customer might expect to realize by implementing the action tip.

The Duke Energy MyHER program has a large library of action tips, numbering between 80 and 90. Half of them were initially developed internally at Duke Energy, and Tendril's "Ask the Expert" technical writer has continued to add to them over time. The large library has enabled the program to avoid any repeats to customers over lengthy periods of time (up to three years). Tip freshness is also managed with display rules that ensure that a diversity of tip types (both in the value of the tip and the area of the household they apply to) is shown, and this management sometimes results in the removal of tips that staff no longer deem relevant. Duke Energy

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validates the monetary values estimated by Tendril for each tip action for reasonableness. Duke Energy and Tendril have identified an opportunity for improvement with action tips in developing additional targeting algorithms for tip display. For example, more sophisticated targeting could be developed that cross-references age of home with relevancy for certain actions (e.g., only display a tip to install new windows to customers with older homes). This targeting of tips in this section are developing into "smart actions", and have been established as a priority at both Duke Energy and Tendril. Tendril has made progress on, converting about 20% of all action tips to smart actions—that is, they are targeted to the appropriate audience. However, not all of the actions and tips in this section are amenable to being used in this fashion, as there is significant variability in their applicability: some tips are only applicable to a few segments, while others have broader customer applicability and have lower capacity to be used as a "targeted" action.

Figure 4-2: MyHER Tips on Saving Money and Energy

How can I save more?

Every little bit helps!

Dry your dishes, and save

Is your dishwasher letting off steam at your expense? Most dishwashers use up to 15% of their energy for DRYING your dishes. Why pay for that? Instead of using the heated drying cycle, choose "energy saver" or "economy" mode. The hot water will evaporate quickly… and save you money in the process.

Save up to $56 per year.

Unplug your second refrigerator or freezer

Most backup refrigerators are at least 10 years old and use a LOT of energy. Many just hold extra drinks or get used during parties. Sound familiar? Consider only plugging yours in when you really need it. You'll be surprised at how much energy you can save. Better yet, why not retire that second fridge altogether?

More Savings Tips at **duke-energy.com/homereport**

The back page of the MyHER reports includes a trend chart that displays how the recipient's home compares to the average and efficient home in energy usage over a year (Figure 4-3). This trend chart can help customers identify certain months where their usage increased relative to the efficient or average home—helping them focus on the equipment and activities most likely to affect their usage. For example, if a home tracks the average home until mid-winter and then spikes well above, that could indicate the heating equipment should be checked.

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Figure 4-3: MyHER 13-month Trend Chart

This month, you used **even less** electricity than last year. **Congratulations!** You are among the **most efficient** homes in your area for the year.
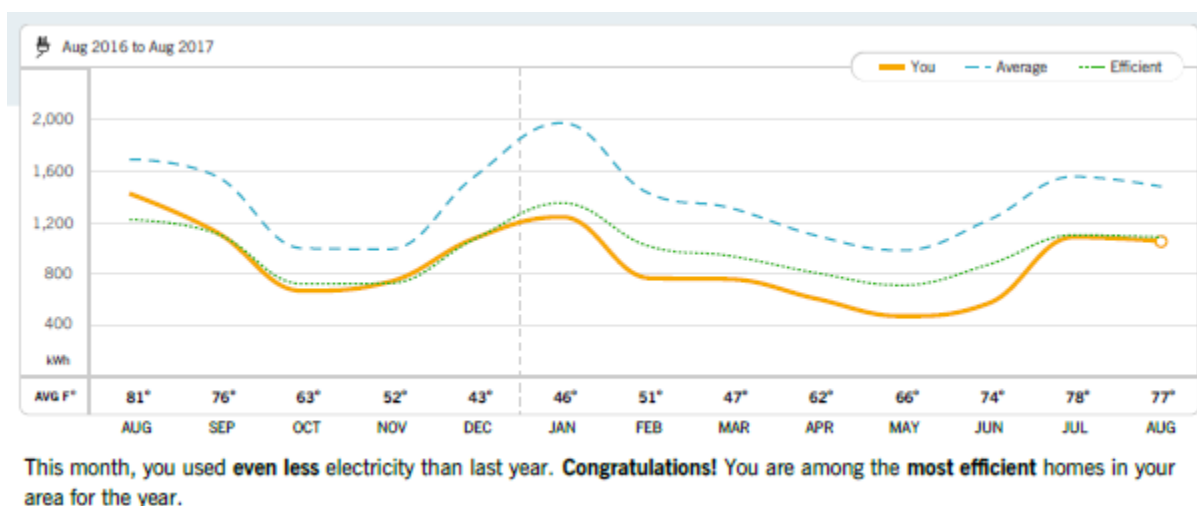
The back page of the MyHER report also reserves space for Duke Energy to include seasonal and programmatic messaging, referred to by program staff as free form text (FFT), that reflects Duke Energy-specific communication objectives. Ensuring that FFT messages are relevant and do not conflict with the actions or tips provided on the front page requires ongoing coordination and monitoring. Broad targeting efforts taking advantage of seasonal relevance, program eligibility, and the presence of end uses such as pools, are used to cross-promote Duke Energy programs. Customer participation databases are cross checked each month to ensure that customers only receive information about programs they have not already participated in; if a customer is found to have participated in the program being promoted in a given month, that customer will receive an alternate, typically more generic, message. Occasionally the action text on the front page will be disabled to accommodate FFT messaging.

FFT messages are developed by the MyHER team in cooperation with Duke Energy's marketing and communications group. Duke Energy staff strive to develop messages that are clever, relevant, and upbeat—some recognize events on the calendar (such as Earth Day) while others provide specific program promotional information or promote general home upgrades (even for measures outside of current programs).

Establishing an FFT calendar early in each year and attempting to avoid last-minute changes to the messages each month has been challenging to implement. Last minute changes have been common due to changes during the course of the year to Duke Energy program promotions and incentive levels. In addition to developing the messages included in each MyHER, the program team must also ensure that the messages conform to expectations established to protect the customer experience. This feature of MyHER is relatively resource-intensive with a lengthy revision-review-approval process with numerous stakeholders accompanying most changes to FFT messages.

To help prevent last minute changes that characterized FFT production in the past, there was renewed focus and energy on prioritizing it as much as possible in 2018 at both Tendril and

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Duke Energy. A product of this renewed energy is an FFT tool under development at Tendril. It will allow for faster and more accurate rendering of FFT messaging, as well as the ability for Duke Energy stakeholders to participate directly in the FFT creation and review process; it is being built as a "self-serve" tool. The implementation of such a tool, due for launch in early 2019, is expected to streamline the FFT process significantly.

Finally, the back page of the reports also provides contact information for the MyHER program at Duke Energy. Customers occasionally contact Duke Energy with questions or concerns about MyHERs and, rarely, to opt-out. Duke Energy's efforts to maintain a high-quality MyHER customer experience is reflected by the high value that is placed on program participant satisfaction and as such, it is closely monitored. Only 1% of MyHER customers contact Duke Energy annually and less than 0.5% of MyHER treatment customers contact Duke Energy to opt-out. The rigorous quality control efforts described earlier have kept quality-related issues from ever reaching customers.

4.2.1.4 MyHER Interactive

Enrollment in MyHER Interactive is still relatively low. The most reliably successful enrollment generators are email campaigns, sweepstakes, and cross-promotion with the High Bill Alerts program. Envelope messaging has also been used, but is less successful. Email campaigns are a very successful enrollment generator because they can use personalized uniform resource locator PURLs (to enable clicking through to the Interactive screen where the customers' account number is auto-populated in the registration process). Program staff revamped the content and graphics of the email campaign in 2018.

Duke Energy continues to prioritize enrollment in Interactive. However, enrollment in MyHER Interactive was not as strong as was hoped, so Tendril is developing a marketing plan to increase enrollments in 2019.

Additionally, Duke Energy has 6 product requests in with Tendril for the "User Profile" section of MyHER Interactive, so as to improve the quality of customer-provided data and in turn, improve clustering models, load disaggregation, the applicability of targeted tips, and other applications that use the data. Duke Energy also continues to roll out AMI meters to customers in the DEC and DEP service territories. With the completion of the AMI deployment, the granularity of customer data will increase, which will directly benefit those who enroll in MyHER Interactive. Currently, about 57% of Interactive customers have AMI meters. For these customers, their usage data is available on MyHER Interactive. However, there have been problems with the transfer of this data to Tendril, which has caused some customer data displays to be erroneous. To remedy this, Tendril is in the process of upgrading their data ingester[11]. Duke Energy and Tendril are considering ways to effectively utilize and meaningfully leverage AMI data.

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[11] Data ingestion refers to the process of importing, cleaning, and organizing large or complex sets of data for storage and/or analysis. Tendril's upgraded data ingester will process AMI data from Duke Energy in a faster, more effective manner.

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Few quality control or process issues pertaining to Interactive were reported in our interviews. However, it should be noted that there is currently no mechanism by which Duke Energy can use or check the quality of data presented on Interactive in a systematic or bulk fashion. All checks are made on an individual customer basis. The bulk of quality control for Interactive is carried out by Tendril.

One opportunity for improvement exists in MyHER Interactive's limitation such that a Duke Energy account can only be associated with one email, and only one email may be associated with any account. Currently, Tendril is evaluating the feasibility of a number of solutions to this problem, which has caused issues for customers attempting to enroll. First, they are attempting to shorten the time it takes to archive emails of customers who leave the program (to disassociate the email from the account). Secondly, they are exploring the possibility of allowing more than one email to be associated with an account. Lastly, they may disable the requirement that login ID's be email addresses. These solutions should open up eligibility to accounts associated with homes in ownership transition, rental transition, and will allow those who own more than one home to have all of their homes associated with their Interactive account.

4.2.1.5 Other MyHER Plans to Further Improve Program Operations

Looking forward, Duke Energy and Tendril are also contemplating other program enhancements that are anticipated to further improve program performance and the customer experience with the program:

- Developing new content specific to shoulder month email MyHERs;
- The full HOMERS rollout;
- Revised service-level agreements (SLAs);
- Duke Energy app; and
- Self-comparisons of energy usage (as opposed to "neighborhood" comparisons).

4.2.2 Customer Surveys - DEC

The customer surveys included questions focused specifically on the experience of and satisfaction with the information provided in MyHERs and awareness of MyHER Interactive—these questions were asked only of households in the treatment group.

Both treatment and control households answered the remaining questions, which focused on assessing:

- Awareness of Duke Energy efficiency program offers;
- Satisfaction with the Duke Energy, and services Duke Energy provides to help households manage their energy use;
- Levels of awareness of and interest in household energy use; motivations and perceived importance;
- Reported behavioral or equipment-based upgrades; and

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▪ Barriers that prevent customers from undertaking energy savings actions.

4.2.2.1 Comparing Treatment and Control Responses - DEC

This section presents the results of survey questions asked of both treatment and control households in DEC and compares the response patterns. Statistically significant differences between treatment and control households are noted.

Duke Energy Customer Satisfaction

Both treatment and control groups' overall satisfaction with Duke Energy are high. Seventy-three percent of treatment customers and 78% of control customers are satisfied or very satisfied with Duke Energy as their electric supplier (rated 8 or higher on a 0-10 point scale); the difference is not statistically significant at the 90% level of confidence.

Control households rated Duke Energy higher on providing excellent customer service, respecting its customers, and providing service at a reasonable cost than treatment households. The differences between the control and treatment group are not statistically significant (Figure 4-4). MyHER does not result in a measurable change in stated customer satisfaction with Duke Energy in DEC.

Figure 4-4: Satisfaction with Various Aspects of Customer Service - DEC
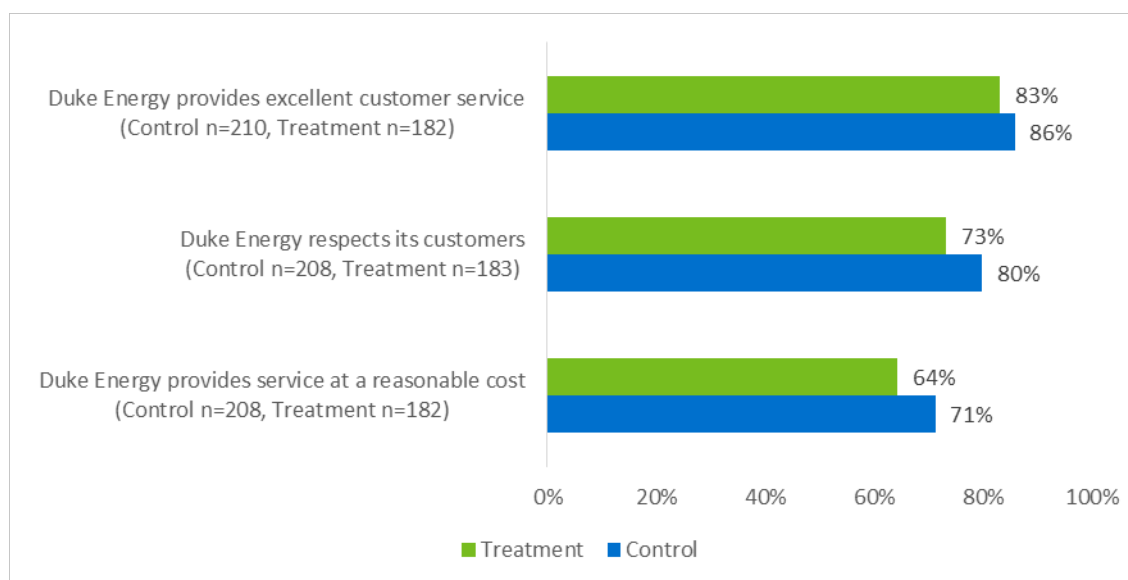
Additionally, the differences between treatment and control customers with respect to satisfaction with the information available about Duke Energy's efficiency programs, the information Duke Energy provides to help customers save on energy bills, and Duke Energy's commitment to promoting energy efficiency and the wise use of electricity are not statistically significant (Figure 4-5), thus MyHER has not measurably changed customers' satisfaction with Duke Energy's promotion of energy efficiency at DEC.

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Figure 4-5: Satisfaction with Energy Efficiency Offerings and Information - DEC
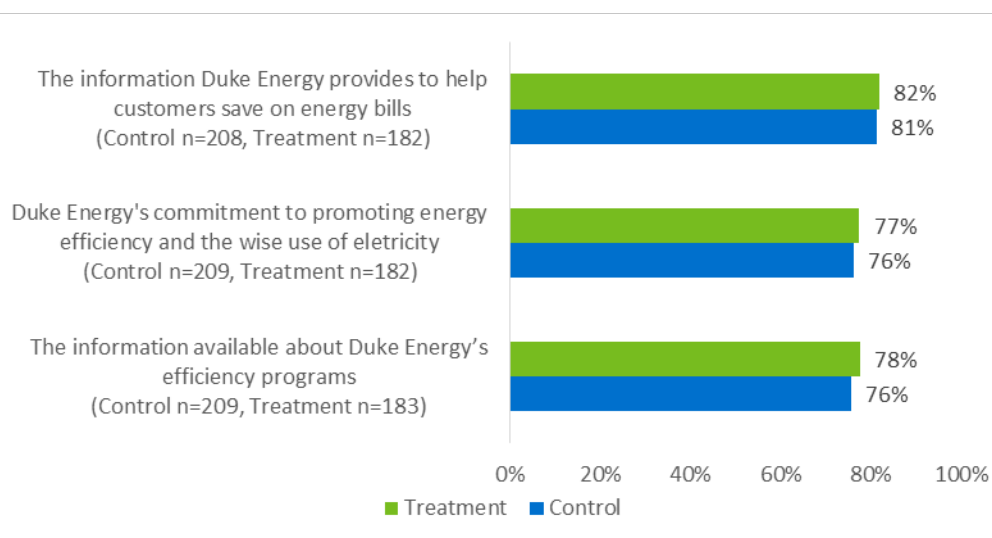
Engagement with Duke Energy's Website

Both groups answered several questions about their use of the Duke Energy website, a proxy for overall engagement with information provided by the utility on energy efficiency and household energy use, and the results showed no significant differences. Table 4-5 shows that 36% of the treatment group and 37% of the control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most commonly reported purpose was to pay their bill.

Table 4-7: Use of Duke Energy Online Account - DEC

Online Account Activity	Treatment Group (n=180)	Control Group (n=204)
Never logged in	36%	37%
Pay my bill	36%	37%
Look for energy efficiency opportunities or ideas	16%	16%

As shown in Figure 4-6, control group households were more likely to report that they accessed the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient, but the difference is not statistically significant. Relatively small percentages of both groups report regular usage of the website for purposes other than bill payment.

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Figure 4-6: Frequency Accessing the Duke Energy Website to Search for Other Information - DEC
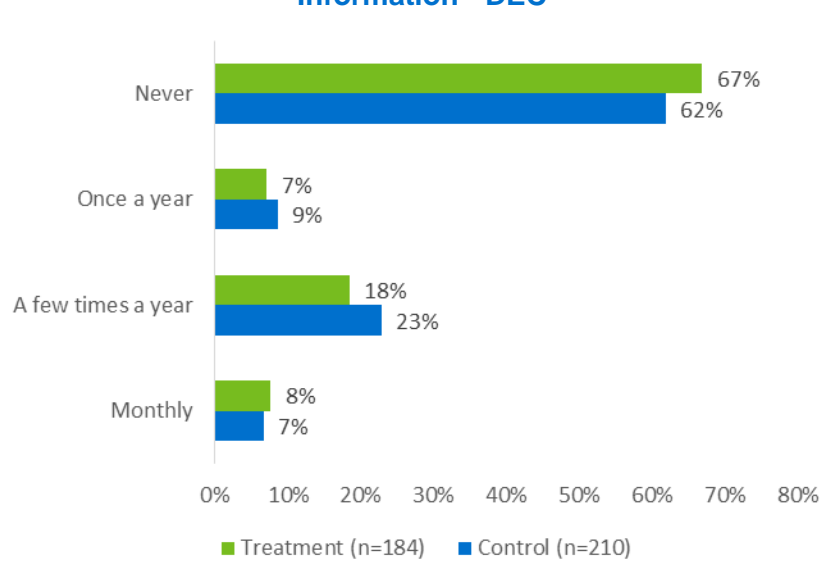
Thirty-six percent of control group and treatment group customers, respectively, reported they would be likely to check the Duke Energy website for information before purchasing major household equipment. The portion of respondents rating their likelihood a "7" or higher on an 11-point scale of likelihood is plotted in Figure 4-7. Overall, MyHER has not produced a measurable change in customer engagement with Duke Energy's standard online offerings (distinct from the online MyHER Interactive offering).

While we observe no effect on customer engagement with Duke Energy online resources attributable to MyHER, the survey responses across both treatment and control customers should be placed into context with their demographics. All survey respondents reside in single-family homes, since the MyHER program is only available to customers in single-family homes, so we should expect that the respondents of this survey should skew towards respondents who have attained a greater age than that might be expected of the general Duke Energy customer base. As we indeed show later in this section, the average age of respondents of this survey is older than what would be expected relative to U.S. Census estimates of the age distribution of the population in North and South Carolinas. About 43% of DEC treatment respondents are 65 years of age or older. About 47% of DEC control customers are included in that age bracket as well. This is in comparison to U.S. Census estimates that 16% of the population of the Carolinas falls into the same age bracket. Therefore, Duke Energy should interpret the responses of this survey as representing an older group of customers than their customer base overall. Residents of multi-family homes would expected to be younger, on average, and would be hypothesized to report higher rates of engagement with Duke Energy's online content.

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Figure 4-7: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment - DEC
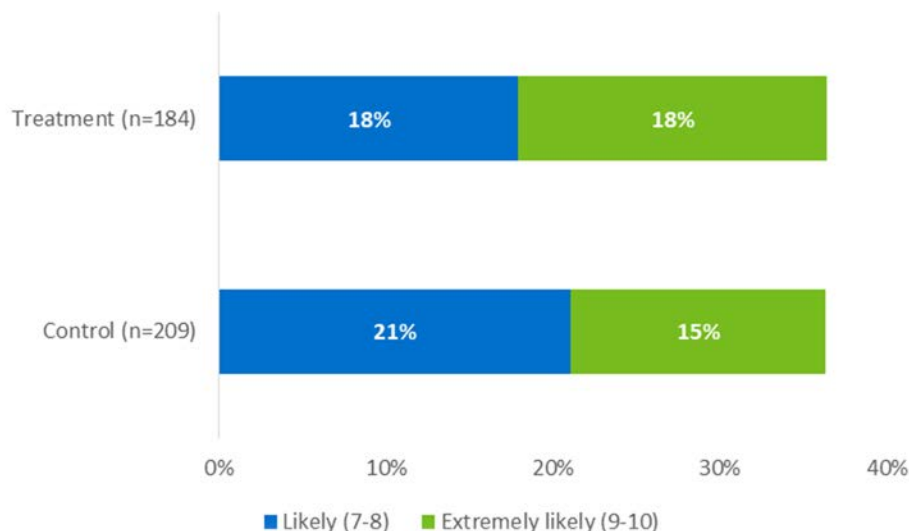
Reported Energy Saving Behaviors

Treatment customers were much more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (73% to 63%; p = .013). Treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-8):

- Fifty-seven percent of the treatment customers and 69% of the control customers reported tracking the total amount of the bill. The difference is statistically significant at the 90% level of confidence.

- About two-thirds of respondents compared usage to previous months. The difference between the treatment and control groups is not statistically significant.

- More than half of respondents compare usage to the same month from last year, but the difference in responses here between treatment and control groups is not statistically significant at the 90% level of confidence.

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Figure 4-8: "Which of the Following Do you Do with Regard to Your Household's Energy Use?" - DEC

Track the total amout of your bill*
- Treatment: 57%
- Control: 69%

Compare usage to previous months
- Treatment: 66%
- Control: 68%

Compare usage to the same month from last year
- Treatment: 55%
- Control: 58%

Track monthly energy use
- Treatment: 45%
- Control: 44%

None of the above**
- Treatment: 16%
- Control: 9%

*statistically significant, p=0.017
**statistically significant, p=0.021

■ Treatment (n=183) ■ Control (n=207)
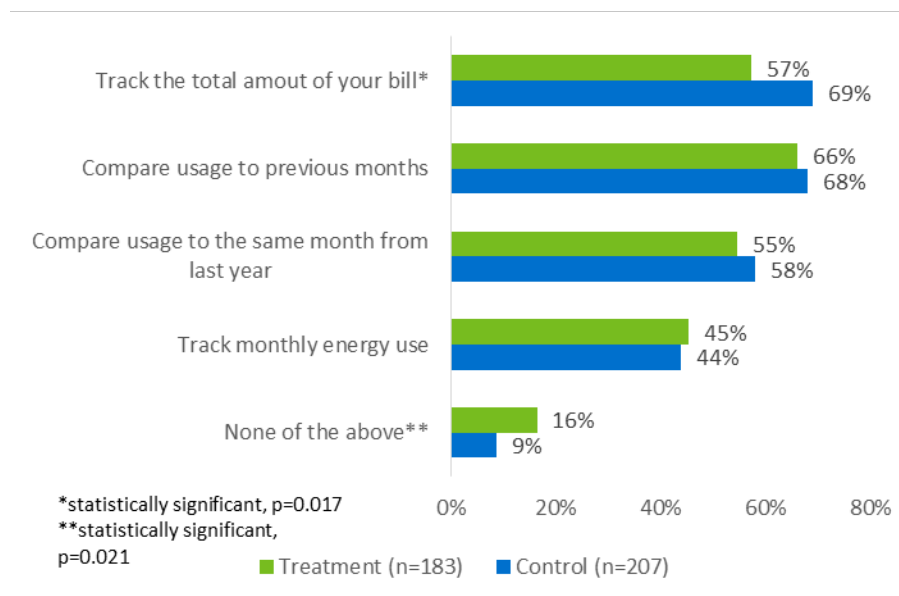
Treatment group respondents were significantly more likely to turn off lights in unused or outdoor areas, adjust heating or cooling setting to save energy, maintain heating or cooling equipment for more efficient operation, fully load clothes washer, fully load dishwasher, wash clothes in cold water, and reduce water heater temperature to save energy than the control group, as shown in Figure 4-9. These differences are statistically significant at the 90% level of confidence.

Figure 4-9: Reported Energy Saving Behaviors - DEC

Turn off lights in unused or outdoor areas (Control n=205, Treatment n=313)*
- Treatment: 72%
- Control: 59%

Adjusted heating or cooling settings to save energy (Control n=199, Treatment n=311)**
- Treatment: 68%
- Control: 58%

Maintain heating or cooling equipment for more efficient operation (Control n=192, Treatment n=311)***
- Treatment: 64%
- Control: 54%

Fully load clothes washer (Control n=198, Treatment n=306)****
- Treatment: 63%
- Control: 49%

Unplug or shut down household electronics when not in use (Control n=202, Treatment n=310)
- Treatment: 55%
- Control: 50%

Use a portable fan or ceiling fan for cooling instead of an air conditioner (Control n=200, Treatment n=308)
- Treatment: 43%
- Control: 44%

Fully load dishwasher (Control n=185, Treatment n=296)*****
- Treatment: 57%
- Control: 44%

Wash clothes in cold water (Control n=200, Treatment n=306)******
- Treatment: 56%
- Control: 43%

Other (Control n=139, Treatment n=171)
- Treatment: 25%
- Control: 23%

Reduced water heater temperature to save energy (Control n=193, Treatment n=299)*******
- Treatment: 28%
- Control: 21%

*statistically significant, p=0.003
**statistically significant, p=0.014
***statistically significant, p=0.024
****statistically significant, p=0.003
*****statistically significant, p=0.006
******statistically significant, p=0.004
*******statistically significant, p=0.089

■ Treatment ■ Control

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Ninety-six respondents (treatment and control customers in total) reported other energy savings actions. Nexant categorized these actions and the results are shown in Figure 4-10. The most commonly reported action, mentioned by 29 respondents, pertains to lighting, such as switching to LED bulbs, etc.

Figure 4-10: Distribution of Other Energy Savings Behaviors - DEC
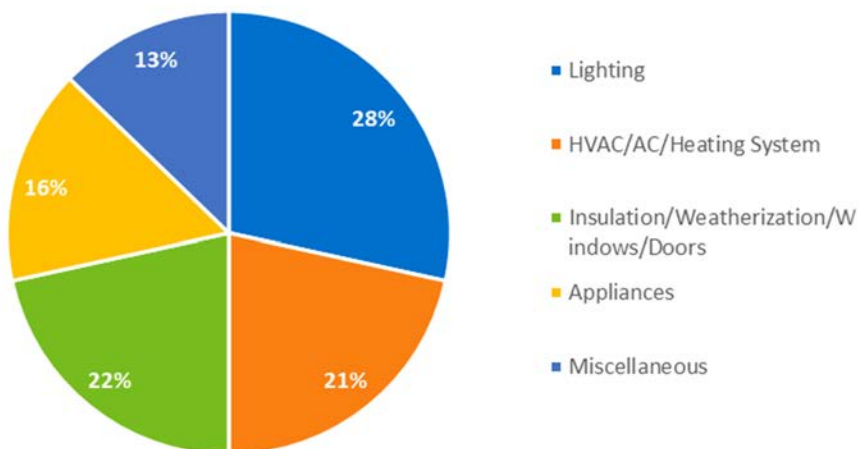
Reported Energy Efficiency Improvements Made

Respondents were provided with a list of energy efficiency improvements and asked if they had done each in the past year. The treatment group had a significantly higher percentage of customers reported having installed lighting with more energy efficient types than the control customers did (Table 4-8). None of the other differences were statistically significant at the 90% level of confidence.

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Table 4-8: Portion Indicating They Had Made Each Energy Efficiency Upgrade - DEC

Upgrade	Control	Treatment
Install energy-efficient lighting (Control n=198, Treatment n=311)*	52%	60%
Purchase ENERGY STAR certified home electronic equipment (a television, for example) (Control n=187, Treatment n=298)	39%	43%
Install energy-efficient kitchen or laundry appliances (Control n=196, Treatment n=306)	34%	39%
Install energy-efficient heating/cooling equipment (Control n=196, Treatment n=302)	33%	34%
Install programmable thermostat or "smart" thermostat (Control n=197, Treatment n=307)	32%	34%
Caulk or weatherstrip (windows or doors) (Control n=194, Treatment n=307)	29%	36%
Install energy-efficient water heater (Control n=195, Treatment n=301)	26%	29%
Add insulation to attic, walls, or floors (Control n=197, Treatment n=301)	23%	23%
Replace windows or doors with more energy-efficient types (Control n=199, Treatment n=308)	20%	26%

*statistically significant, p=0.084

Behavior and Upgrade Category Variables

To examine broader patterns within the survey responses that cover many specific cases of energy saving behavior and upgrades, participant responses to the behavior and upgrade questions were combined into behavior vs. upgrade categories and were also combined into end-use categories. As shown in (Table 4-9), treatment group respondents were significantly more likely to engage in energy efficiency behaviors and improvements generally, and also undertook significantly more energy efficiency behaviors.

Table 4-9: Percent of Households That Have Undertaken Energy Efficiency Actions - DEC

Behaviors/Improvements	Treatment Group	Control Group
Any Energy Efficiency Behavior (Treatment n=314, Control n=206)*	73%	62%
Average Number of Behaviors**	5.13	4.24
Any Energy Efficiency Improvements (Treatment n=314, Control n=203)***	69%	61%
Average Number of Improvements	3.15	2.77

*statistically significant, p=0.009
**statistically significant, p=0.004
***statistically significant, p=0.046

Additionally, Table 4-10 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. In six of the nine categories, treatment group members were significantly more likely to have undertaken at least one of these activities.

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These results demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers.

Table 4-10: Percent of Households That Had Undertaken Energy Efficiency Actions, by End Use Category - DEC

Behaviors/Improvements	Treatment Group	Control Group
Water Heating Behaviors and Upgrades (Treatment n=314, Control n=206)[*]	71%	61%
Water Heating Behaviors (Treatment n=314, Control n=204)[**]	71%	59%
Space Heating Behaviors and Upgrades (Treatment n=314, Control n=205)[***]	72%	62%
Space Heating Behaviors (Treatment n=314, Control n=205)[****]	72%	61%
Space Heating Upgrades (Treatment n=310, Control n=202)	45%	46%
Lighting Behaviors and Upgrades (Treatment n=314, Control n=206)[*****]	73%	61%
Electronics and Appliances Behaviors and Upgrades (Treatment n=314, Control n=205)[******]	68%	59%
Electronics and Appliances Upgrades (Treatment n=312, Control n=199)	52%	48%
Sealing and Insulation Behaviors and Upgrades (Treatment n=312, Control n=200)	47%	43%

[*]statistically significant, p=0.024
[**]statistically significant, p=0.007
[***]statistically significant, p=0.013
[****]statistically significant, p=0.009
[*****]statistically significant, p=0.005
[******]statistically significant, p=0.025

Customer Motivation and Awareness

The control group and treatment groups report similar levels of motivation for saving energy. Eighty-one percent of control customers indicated that knowing they are using energy wisely is "important" or "extremely important", compared to 78% of treatment customers. This difference is not statistically significant (Figure 4-11).

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Figure 4-11: "How Important Is It for You to Know if Your Household is Using Energy Wisely?" - DEC
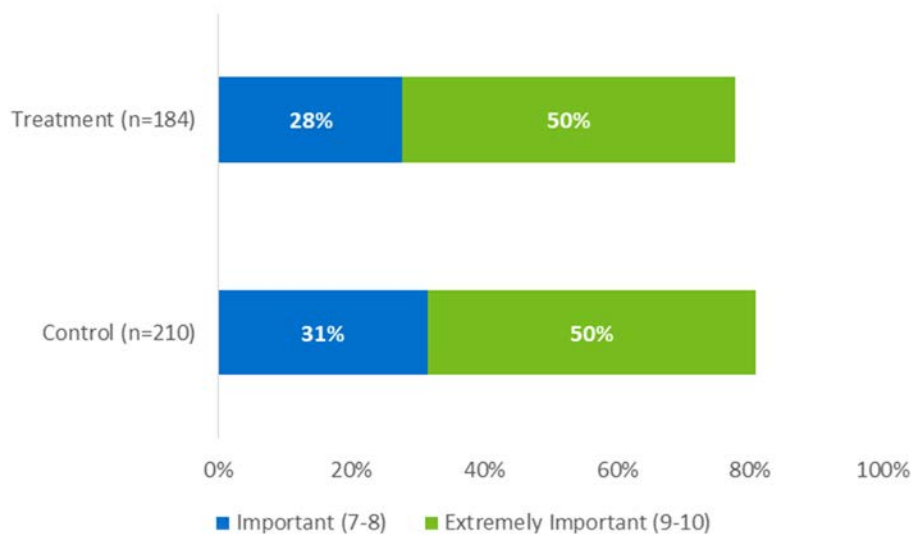
Customers were asked to rate, on a scale of 0 to 10, the importance of various reasons why they might try to reduce their home's energy use. The strongest motivation for both groups is saving money on their energy bills, where 89% of treatment respondents and 89% of control respondents reported that saving money on their energy bills was "important" or "extremely important". Eighty-seven percent of control respondents and treatment respondents respectively indicated that "avoiding waste" was "important" or "extremely important" to them. Eighty-six percent of treatment customers and 83% of control customers reported that "conserving energy resources" was "important" or "extremely important". Eighty percent of treatment customers and control customers respectively reported that "helping the environment" was "important" or "extremely important". None of the differences between treatment and control groups are statistically significant. Figure 4-12 contains the frequency of responses to this question, shown as a percentage for both treatment and control groups.

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Figure 4-12: "Please Indicate How Important Each Statement Is to You" - DEC
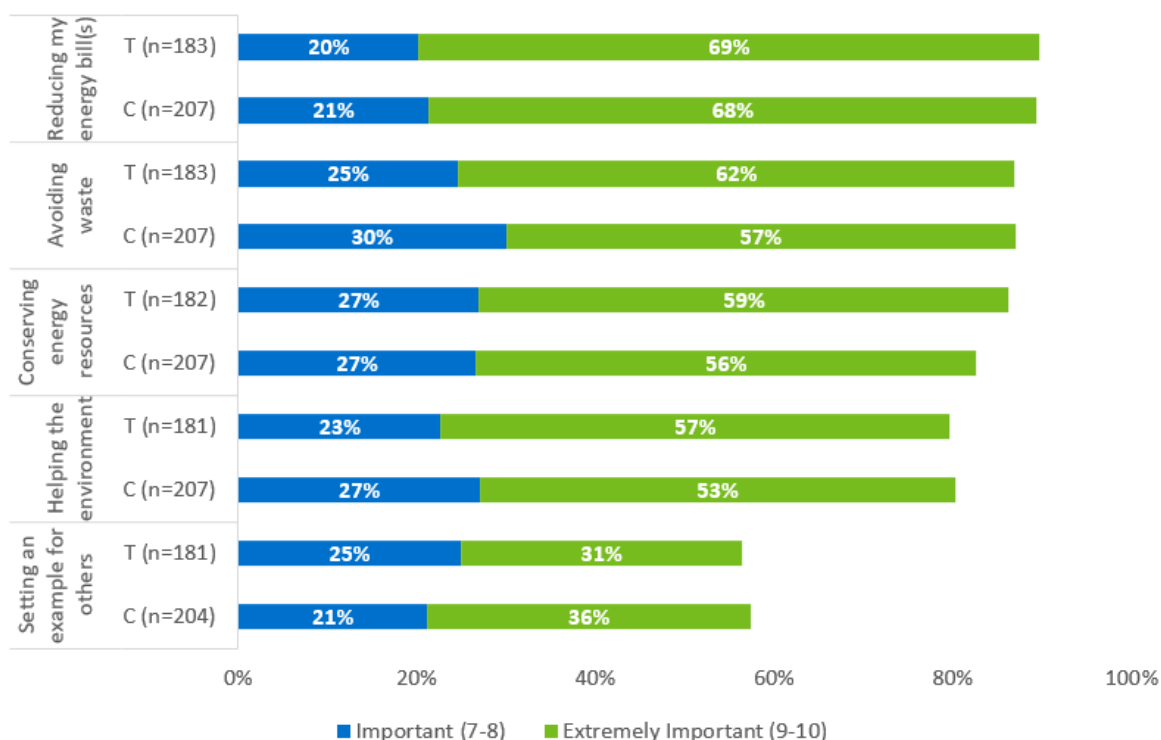
As indicated by Figure 4-13, among treatment customers, 67% rated themselves above a seven on a 0-10 point scale of knowledgeability of ways to save energy, while 65% of control group customers rated themselves this way. The difference is not statistically significant at the 90% level of confidence.

Figure 4-13: "How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?" - DEC
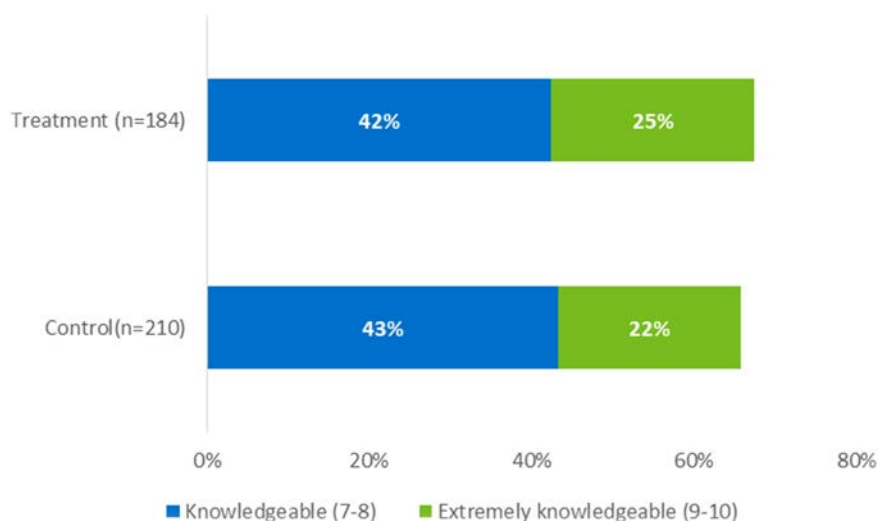
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Treatment respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of both control group and treatment group respondents who took the primary survey rephrased to ask them how useful they *might expect* that information to be. Table 4-11 presents results of the portion rating each item a "7" or higher on an 11-point scale of the hypothetical usefulness from the control and treatment customers who took the primary survey, and Table 4-12 presents the comparison results between the actual usefulness of each item rated by treatment customers (treatment-only survey) and the hypothetical usefulness rated by control customers in the primary survey).[12]

The results from the hypothetical usefulness rating (Table 4-11) did not find statistically significant differences in expected usefulness of information that is found on MyHER reports. Comparisons between the responses of customers in the treatment-only survey and control customers in the primary survey show that treatment customers respond differently to questions about information presented in MyHERs if the questions are asked in the context of the actual MyHER reports, however the response patterns overall are similar – not much is seen by way of a significant separation between treatment and control customers in terms of usefulness of report content. However, there is one exception: Table 4-12 shows that control customers were significantly more likely to think that "Information about services and offers from Duke Energy" might be useful than treatment customers actually thought they were. This finding suggests that there may be an opportunity to improve the presentment of information in MyHERs about Duke Energy's services and offerings.

Table 4-11: Hypothetical Usefulness of HER Features Treatment and Control - DEC

HER Feature	Control Group_Primary Survey	Treatment Group_Primary Survey
Graphs that display your home's energy use over time	71% (n=204)	66% (n=181)
Information about services and offers from Duke Energy	67% (n=205)	65% (n=181)
Tips to help you save money and energy	67% (n=205)	72% (n=183)
Examples of the energy use associated with common household items	67% (n=203)	66% (n=182)
Your home's energy use compared to that of similar homes	57% (n=202)	60% (n=181)
Customized suggestions for your home	56% (n=200)	63% (n=180)

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[12] The implementation of a treatment-only survey, in addition to a primary survey provided to both treatment and control customers, afforded an opportunity to test the responses of treatment customers to a question asking about a MyHER feature they have actually seen vs. asking generally about how useful the information is (outside of the context of MyHER). This test leads us to the conclusion that the way customers are asked about this question matters and we recommend that in future surveys, MyHER treatment customers see questions about report content placed specifically in the context of them having seen the content in their reports, as opposed to in the hypothetical.

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Table 4-12: Actual Usefulness versus Hypothetical Usefulness of HER Features Treatment and Control - DEC

HER Feature	Control Group_Primary Survey	Treatment Group_Treatment Only Survey
Graphs that display your home's energy use over time	71% (n=204)	76% (n=135)
Information about services and offers from Duke Energy*	67% (n=205)	58% (n=134)
Tips to help you save money and energy	67% (n=205)	66% (n=135)
Examples of the energy use associated with common household items	67% (n=203)	64% (n=135)
Comparison to similar homes	57% (n=202)	53% (n=135)
Customized suggestions for your home	56% (n=200)	59% (n=134)

*statistically significant, p=0.089

Barriers to Customers Undertaking Energy Savings Actions

When asked the reasons why customers might not be able to save as much as energy as they would like, there were no statistically different response patterns between treatment and control customers, which indicates that MyHER is not making a measurable change in the potential barriers mentioned in this survey. The most commonly reported barrier is "the initial cost of energy efficient equipment is too high" (Figure 4-14): 59% of treatment respondents reported this as a barrier and 58% of control respondents did so as well. The least-commonly cited barrier was lack of expertise: 33% of treatment customers cited lack of expertise as a barrier as did 36% of control customers.

Figure 4-14: Barriers to Customers Undertaking Energy Savings Actions - DEC
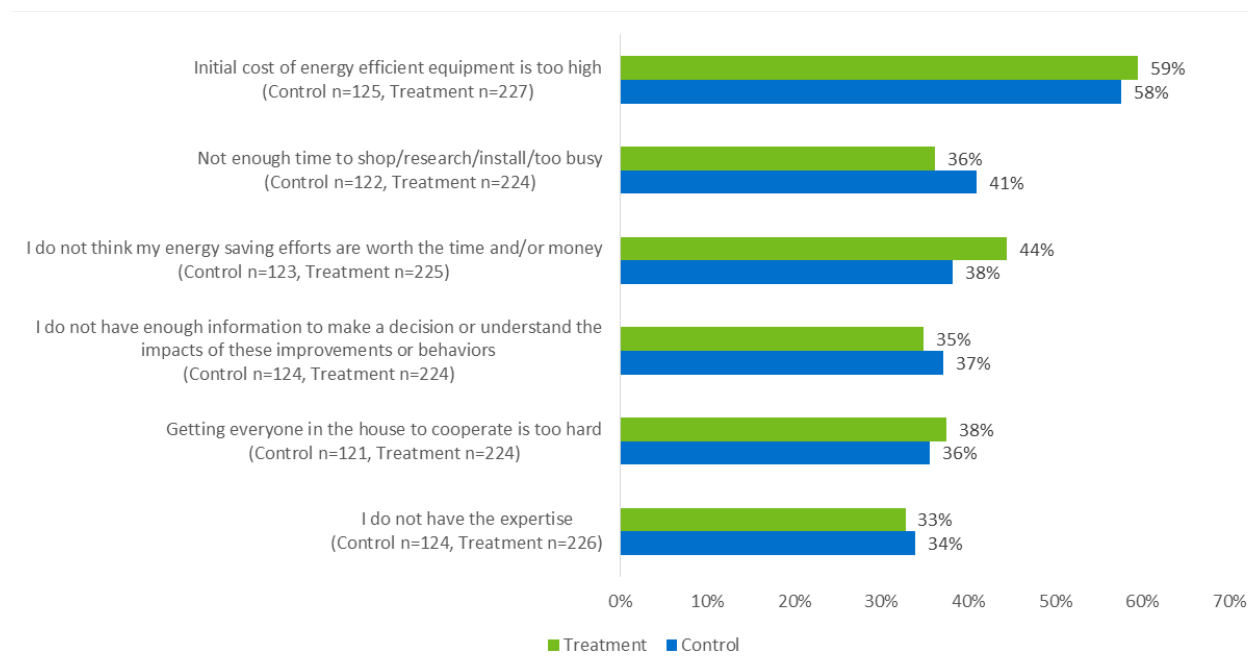
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Suggestions about Duke Energy Improving Service Offerings

The survey provided an open-ended question to elicit suggestions about Duke Energy improving its service offerings to help customers reduce energy use. Only 22% (119 of 548, treatment and control customers in total) offered suggestions, including sixteen who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 42 of the 119 with suggestions, reflected a desire for more energy savings information, programs, free light bulbs, and more incentives:

- "*I would love to have a visit/walk through with someone who could look at our home and make suggestions*"

- "*Send free light bulbs*"

- "*Give rebates on appliances*"

- "*Continue to supply usage statistics*"

- "*Provide a smart device at the breaker box that would connect to your smartphone to tell you your energy consumption. Something real-time would be helpful. Then you would / could modify your daily activities real-time based on what you are seeing*"

Other comments centered on other suggestions, such as better communication and reducing price/providing senior and disability discounts. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-13.

Table 4-13: Suggestions about Duke Energy Improving Service Offerings - DEC

Suggestion	Count	Percent of Respondents Mentioning (n=119)	Percent of Total Mentions (n=130)
Provide more energy savings information, programs, free light bulbs and more incentives	42	35%	32%
Better communication	23	19%	18%
Reduce price/provide senior and disability discounts	22	18%	17%
Appreciation	16	13%	12%
Miscellaneous	7	6%	5%
Reduce power outages	6	5%	5%
Improve website	4	3%	3%
Provide more detailed info in MyHER/offer MyHER to Townhomes/do more survey	5	4%	4%
Expressed Frustration	5	4%	4%

Evidence of MyHER Effects

As noted above, while formal statistical testing found a number of differences among treatment and control group households for individual questions, the Nexant team sought to understand if

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the overall pattern of survey responses differed among treatment and control households. To do this, we categorized each survey question by topic area and then counted any survey item in which the treatment households provided a more positive response than the control households. Table 4-14 presents the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category. A response is considered "favorable" if the treatment group gave a response that is consistent with the program objectives of MyHER.

Table 4-14: Survey Response Pattern Index - DEC

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-saving Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	4	11	36%
Barriers to Customer Undertaking Energy Savings Actions	3	6	50%
Customer Satisfaction with Duke Energy	0	4	0%
Total	**31**	**49**	**63%**

Nexant's approach consists of the following logical elements:

- Assume the number of positive responses between treatment and control customers will be equal if MyHER lacks influence;

- Count the total number of topics and questions asked of both groups – there are seven topic areas and 49 questions;

- Note any item for which the treatment group outperformed the control group – the treatment group outperformed the control group in 31 questions, or 63% of the total questions;

- Since this value is more than 50% we can conclude that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey.

- Calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 2% (p-value = 0.021). Since this probability is less than 10%, we reject the null hypothesis (that the number of positive responses for treatment and control customers are equal) at the 90% level of confidence.

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Because this analysis compares the response patterns between the treatment and control group, if the MyHER program did not influence customers, one would expect the treatment group to "score higher" on roughly half of the questions. In other words, if the MyHER is not influencing treatment group customers, there is a 50/50 chance that they will "outperform" the control group as many times as not. For a more detailed description of the index framework, see Appendix G.

We call out the survey area covering general customer satisfaction with Duke Energy as an area of particular note: treatment customers reported lower satisfaction scores than control customers for all four general satisfaction questions. Nexant recommends that the MyHER program staff coordinate with any internal customer satisfaction data collection efforts to cross-reference these findings with any learnings on DEC customer satisfaction. The lower satisfaction scores for DEC treatment customers may indicate an opportunity for new MyHER messaging or content in DEC.

Respondent Demographics

Nearly all respondents—93% of treatment group customers and 94% of control group customers—own their residence. More than half of households surveyed have two or fewer residents, but about 19% of treatment households and 20% of control households have four or more residents. There are no statistically significant differences in the distribution of ownership or age of homes assigned to the treatment and control groups (Figure 4-15) (chi-squared test).

Figure 4-15: "In What Year Was Your Home Built?" - DEC
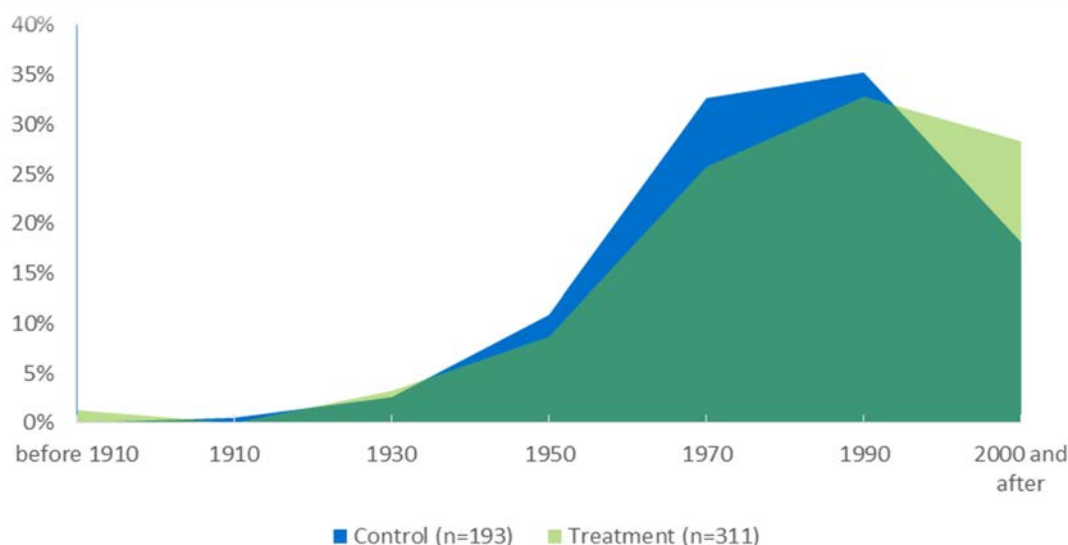
Figure 4-16 shows distribution of home square footage is similar between control and treatment households. The average square footage above ground is 2,031 for control households and 1,954 for treatment households, and the difference is not statistically significant.

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Figure 4-16: How many square feet is above ground living space? - DEC
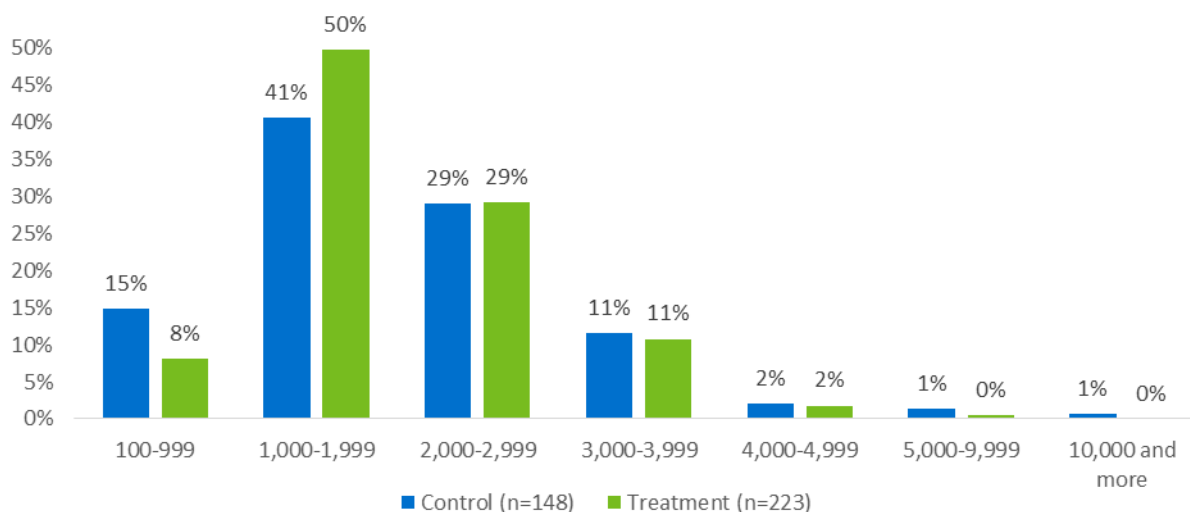
Respondent ages are relatively close to those reported by the U.S. Census American Community Survey (ACS) for Carolinas. The lowest age category (25-34) is often underrepresented when sampling based on residence in single family homes, given that many members of that population are in apartments, dormitories, or living with other family members. This common underrepresentation is true in this survey study, as well. Additionally, the average age is 62 for both control group respondents and treatment group respondents (see Table 4-15).

Table 4-15: Respondent Age Relative to American Community Survey - DEC

Age	Treatment Group (n=311)	Control Group (n=191)	2017 American Community Survey_Carolinas[13]
25-34	3%	3%	13%
35-44	8%	9%	13%
45-54	21%	19%	13%
55-64	25%	21%	13%
65 and over	43%	47%	16%

Figure 4-17 shows the primary heating fuel type used in control and treatment customers' households. Nearly half of treatment (48%) and control (46%) customers use electricity in their

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[13] American Community Survey (ACS) is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.
https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_SPL_K200104&prodType=table

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households for heating. Forty-five percent of treatment customers and 43% of control customers use natural gas for heating. These differences are not statistically significant.

Figure 4-17: Primary Heating Fuel in Households - DEC
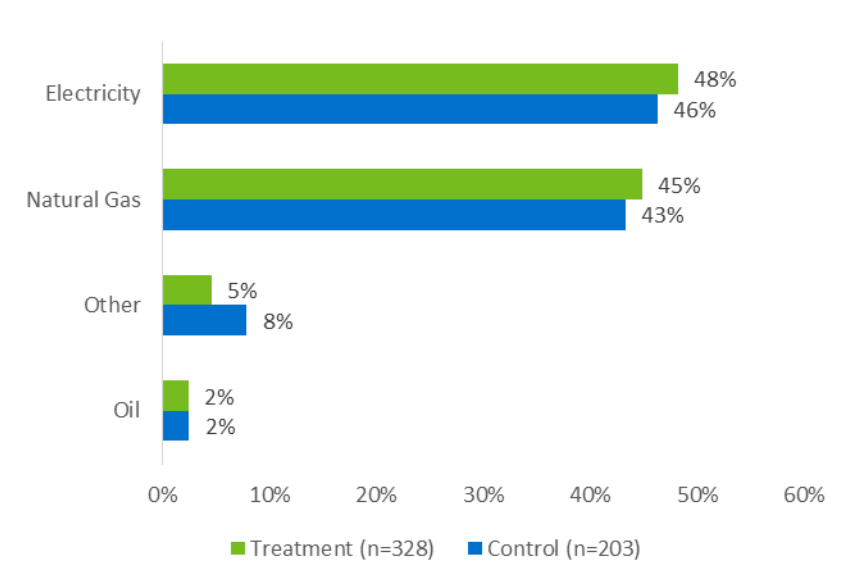
4.2.2.2 Treatment Households: Experience and Satisfaction with MyHER - DEC

A large majority of Treatment Only household respondents, 93%, (142 of 152) recalled receiving at least one of the MyHER reports.

The survey asked those that could recall receiving at least one MyHER report if they could recall how many individual reports they had received "in the past 12 months" (Figure 4-18). The survey launched in January 2019, which means that most recipients would have received 8 MyHERs in the year since February 2018. Thirty-two percent (44 of 136) responded that they received 11 to 12 home energy reports in the past 12 months. The scattered distribution of responses related to recall is consistent with the difficulty of recalling an exact number of reports, however the question is valuable for grounding respondents in the experience of receiving a MyHER before asking them more specific questions about the document.

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Figure 4-18: Reported Number of MyHERs Received "In the past 12 months" (n=136) - DEC
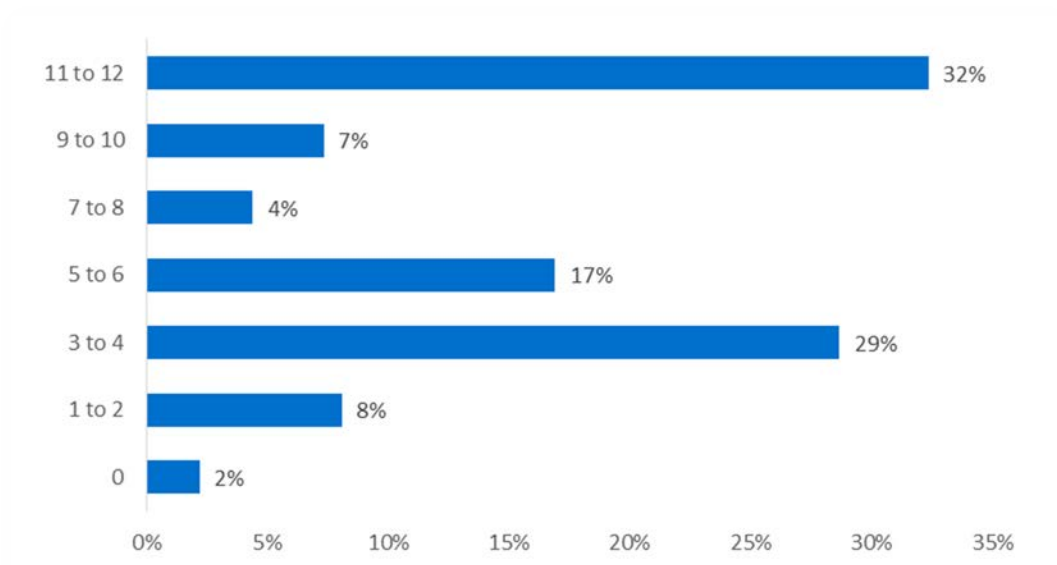
Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-19, when asked how often they read the reports, 99% of respondents indicated they "always" or "sometimes" read the reports. Two respondents (1%) indicated they do not read the reports.

Figure 4-19: How Often Customers Report Reading the MyHER (n=138) - DEC

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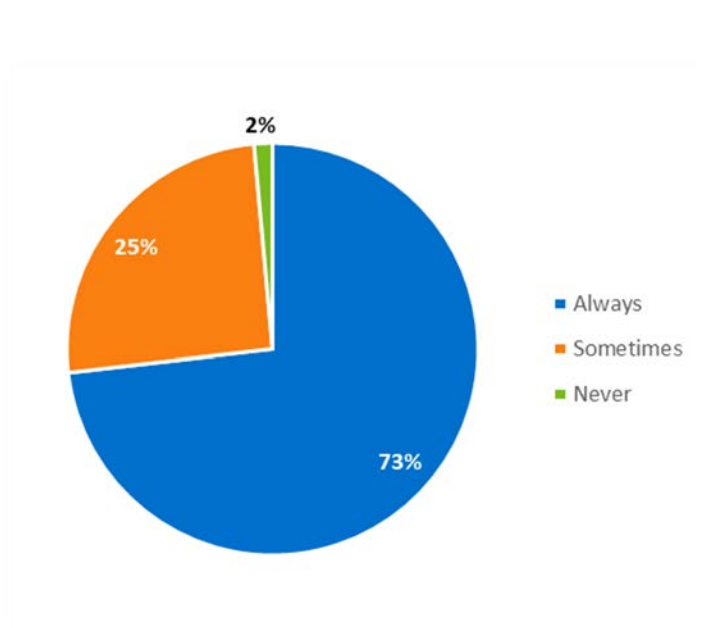
Eighty-seven percent (104 of the 120 respondents that provided a rating) reported being "somewhat" or "very" satisfied with the information contained in the reports (Figure 4-20). The survey asked a further question to the respondents of why they said so: sixty-one of the satisfied respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports' ability to engage the customer and provide greater awareness. The customers who reported being somewhat satisfied most often simply described the reports as "helpful."

Figure 4-20: Satisfaction with the Information in MyHER Reports (n=120) - DEC
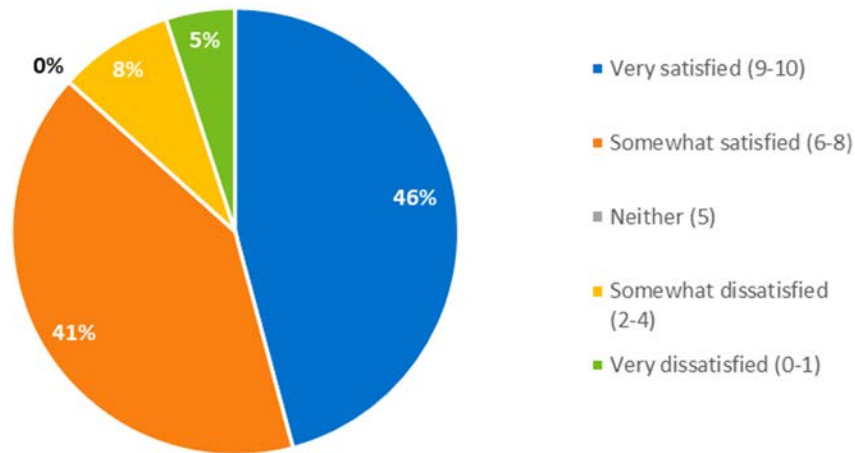
When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home's energy use, with 71% of respondents rating their agreement a seven or higher on a 0-10 point scale, and that they use the report to gauge how successful they are at saving energy (65% rating a seven or higher). More than half (59%) agreed that the reports provided the details they needed to understand their home's energy usage. Respondents provided weaker agreement to statements about the pertinence of the tips provided to their homes and whether they have taken actions to use less energy than they would not have since reading MyHERs. A relatively small percentage (11%) agreed with the statement that the information provided is confusing (Figure 4-21).

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Figure 4-21: Level of Agreement with Statements about MyHER (0-10 Scale) - DEC
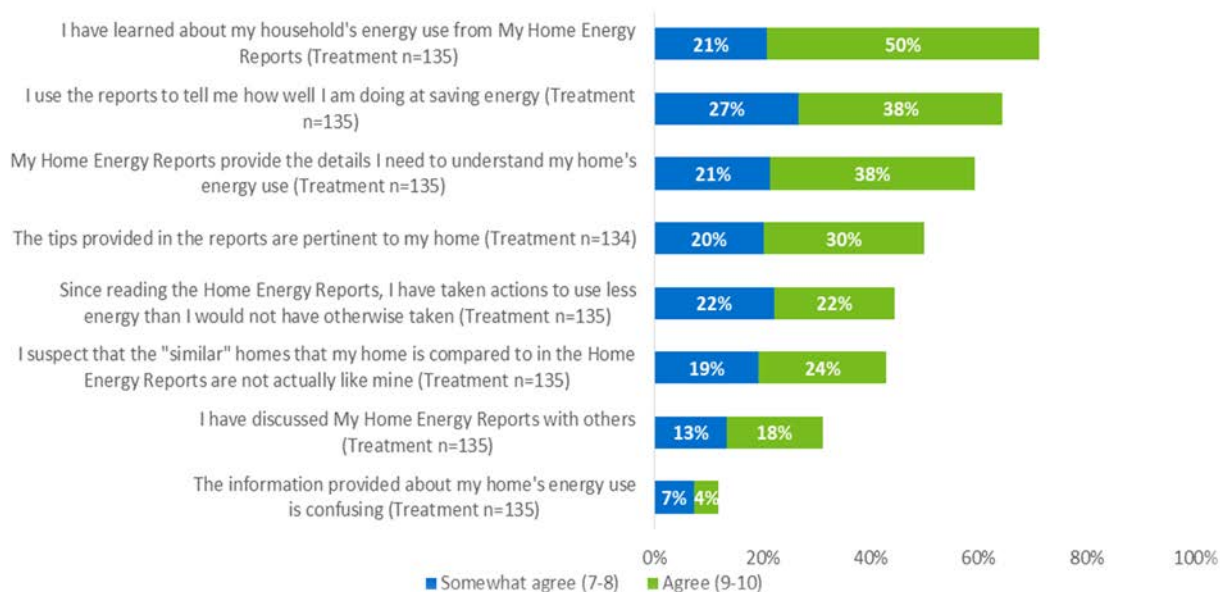
The survey provided an open-ended question to elicit suggestions about potential improvements to MyHER among those that had reported reading at least one report. Only 27% (37 of 136) offered suggestions, including seven who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 16 of the 37 with suggestions, questioned accuracy of the comparison in the report. Fifteen of the 37 with suggestions reflected a desire for more specific information or details about their home and specific actions they should take. Some of these requests reflected interest in understanding at a more granular level how their home uses energy and energy consumption information related to appliances:

- "*By explaining what factors influence our rating*"

- "*I know it's probably not possible but it would be nice to see the actual percentage of what in the household is using what energy…*"

- "*Be more specific as to which appliances, etc. are using how much energy compared to a standard or an efficient use*"

- "*Narrow the comparison to homes closer in size and age along with the number of household members to each consumer*"

- "*Pinpoint possible problems that could be causing energy waste*"

Other comments centered on other suggestions (such as providing free energy assessment, etc.), and a few respondents that simply did not see value in the reports. Responses coded as recommending production changes focus on changing the delivery method of MyHER reports as follows:

- "*Send via email....*"

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- ▪ "*Send them via email instead of wasting paper and stamps*"

Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-16.

Table 4-16: Distribution Suggestions for Improvement (Multiple Responses Allowed) - DEC

Suggestion	Count	Percent of Respondents Mentioning (n=37)	Percent of Total Mentions (n=47)
Don't believe comparison/accuracy	16	43%	34%
Provide more specific information or details	15	41%	32%
Appreciate the Home Energy Report	7	19%	15%
Change production (mail, paper, format)	4	11%	9%
Expressed frustration	2	5%	4%
Other suggestions (such as providing home inspection, etc.)	2	5%	4%
Don't see value/dislike	1	3%	2%

Treatment households were also asked questions that focused on the awareness and use of MyHER Interactive, revealing low awareness of the online Interactive platform:

- ▪ Only 28% of treatment customers are aware of MyHER Interactive;

- ▪ Among aware customers, 92% reported that they had not signed up to use MyHER Interactive; and

- ▪ When asked why they haven't signed up to use MyHER Interactive, 30% of respondents reported that they were very busy, 22% reported that they were not interested in it, and 9% further reported that they did not know about it.

4.2.3 Customer Surveys - DEP

As was the case for DEC, the DEP customer surveys included a section of questions focused specifically on the experience of and satisfaction with the information provided in MyHERs, and the awareness of MyHER Interactive—these questions were asked only of households in the treatment group. Both treatment and control households answered the remaining questions, which focused on assessing:

- ▪ Awareness of Duke Energy efficiency program offers;

- ▪ Satisfaction with the Duke Energy, and services Duke Energy provides to help households manage their energy use;

- ▪ Levels of awareness of and interest in household energy use; motivations and perceived importance;

- ▪ Reported behavioral or equipment-based upgrades; and

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- Barriers that prevent customers from undertaking energy savings actions.

4.2.3.1 Comparing Treatment and Control Responses

This section presents the results of survey questions asked of both treatment and control households in DEP and compares the response patterns between the two groups. Statistically significant differences between treatment and control households are noted.

Duke Energy Customer Satisfaction

Both treatment and control groups' overall satisfaction with Duke Energy are high. Seventy-six percent of treatment customers and 74% of control customers are satisfied or very satisfied with Duke Energy as their electric supplier (rated eight or higher on a 0-10 point scale); the difference is not statistically significant at the 90% level of confidence.

Treatment households rated Duke Energy higher on providing service at a reasonable cost, while control households rated Duke Energy higher on respecting its customers. These differences between treatment and control groups are also not statistically significant (Figure 4-22). Treatment and control households rated Duke Energy the same on providing excellent customer service. MyHER does not result in a measurable change in stated customer satisfaction with Duke Energy in DEP.

Figure 4-22: Satisfaction with Various Aspects of Customer Service - DEP
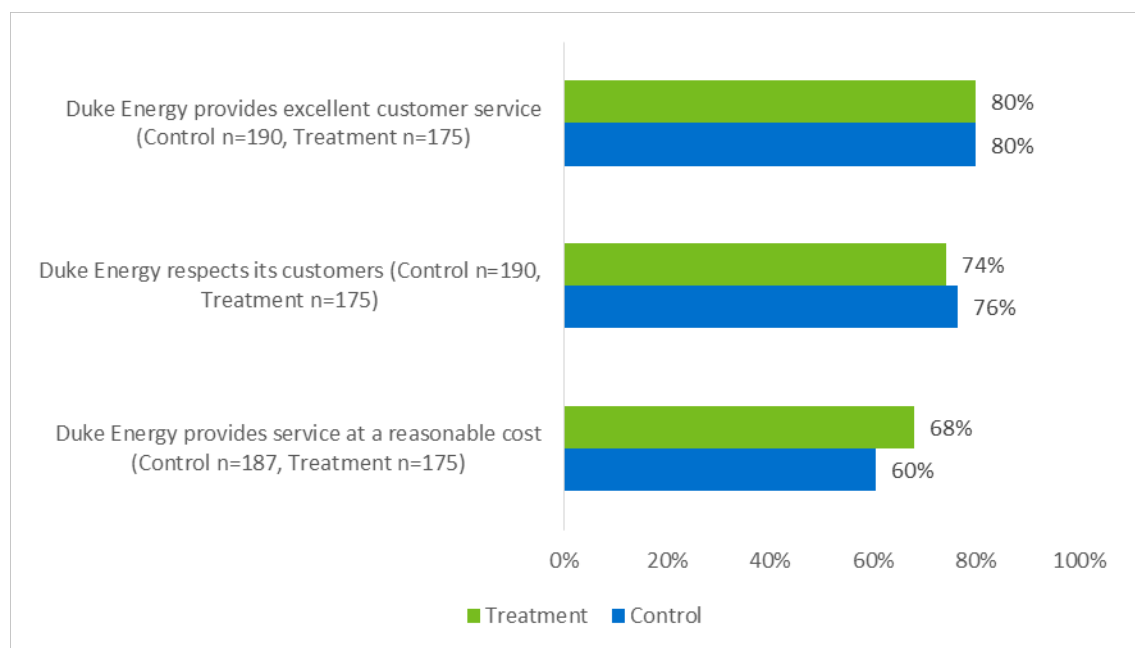
On the other hand, treatment group responses indicate that MyHER reports had a significant positive effect on customer satisfaction with certain aspects of Duke Energy's energy efficiency efforts (Figure 4-23). The differences between treatment and control customers with respect to satisfaction with the information available about Duke Energy's efficiency programs, the information Duke Energy provides to help customers save on energy bills, and Duke Energy's

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commitment to promoting energy efficiency and the wise use of electricity are statistically significant at the 90% level of confidence.

Figure 4-23: Portion Satisfied with Energy Efficiency Offerings and Information - DEP
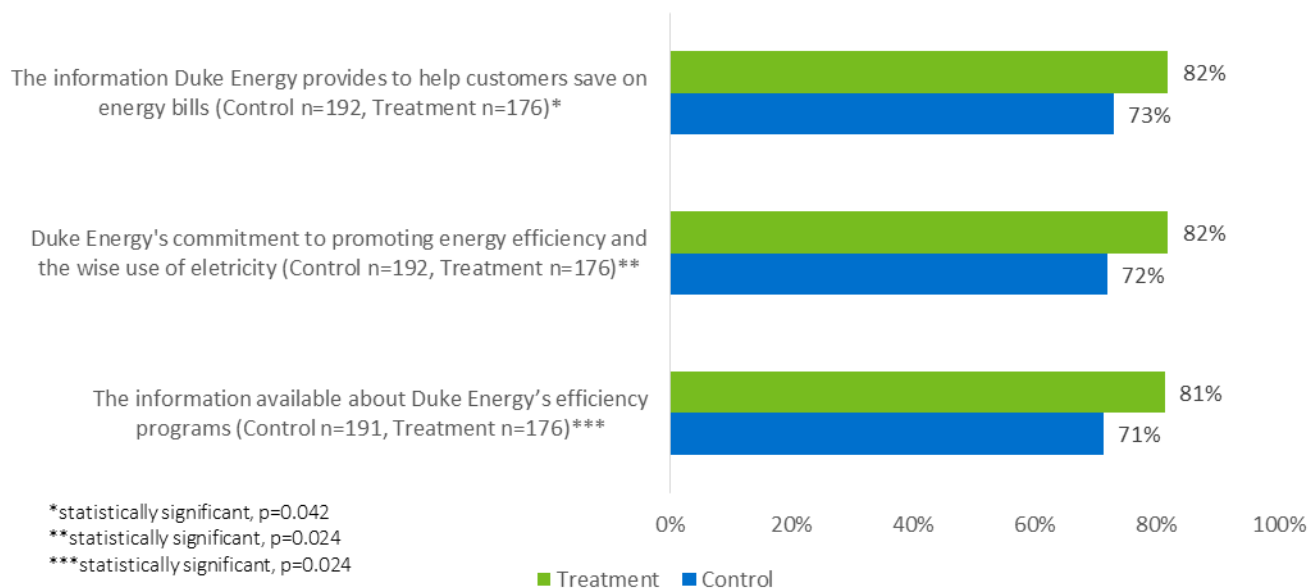
The information Duke Energy provides to help customers save on energy bills (Control n=192, Treatment n=176)*
- Treatment: 82%
- Control: 73%

Duke Energy's commitment to promoting energy efficiency and the wise use of eletricity (Control n=192, Treatment n=176)**
- Treatment: 82%
- Control: 72%

The information available about Duke Energy's efficiency programs (Control n=191, Treatment n=176)***
- Treatment: 81%
- Control: 71%

*statistically significant, p=0.042
**statistically significant, p=0.024
***statistically significant, p=0.024

(Axis: 0% 20% 40% 60% 80% 100%)

■ Treatment ■ Control

Engagement with Duke Energy's Website

Both groups answered several questions about their use of the Duke Energy website, a proxy for overall engagement with information provided by the utility on energy efficiency and household energy use. Table 4-17 shows that 42% of the treatment group and 38% of the control group reported they had never logged in to their Duke Energy accounts. Among those that had logged in, the most commonly reported purpose was to pay their bill.

Table 4-17: Use of Duke Energy Online Account - DEP

Online Account Activity	Treatment Group (n=174)	Control Group (n=185)
Never logged in	42%	38%
Pay my bill	36%	38%
Look for energy efficiency opportunities or ideas	10%	8%

Treatment group households were more likely to report that they accessed the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make their home more energy efficient, but the difference is not statistically significant. Relatively small percentages of both groups report regular usage of the website for purposes other than bill payment, as shown in Figure 4-24.

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Figure 4-24: Frequency Accessing the Duke Energy Website to Search for Other Information - DEP
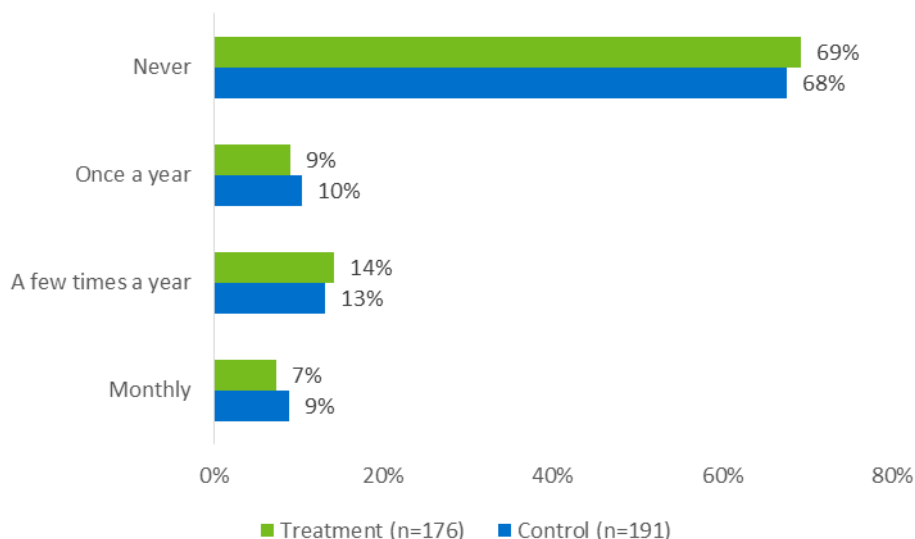
Thirty-nine percent of control group and 41% of treatment group customers reported they would be likely to check the Duke Energy website for information before purchasing major household equipment. The difference between the control and treatment group is not statistically significant at the 90% level of confidence. The portion of respondents rating their likelihood a "7" or higher on an 11-point scale of likelihood is plotted in Figure 4-25.

Overall, MyHER has not produced a measurable change in customer engagement with Duke Energy's standard online offerings (distinct from the online MyHER Interactive offering) at DEP. As stated earlier in the presentation of DEC survey findings, these survey responses relating to engagement with Duke Energy's online resources should be placed into context with the DEP respondents' demographics. All DEP survey respondents reside in single-family homes, since the MyHER program is only available to customers in single-family homes. We therefore expect that the DEP respondents of this survey should skew towards respondents who have attained a greater age than that might be expected of the general Duke Energy customer base. We indeed find, as we discuss at greater length later in this section, that the average age of respondents of this survey is older than what would be expected relative to U.S. Census estimates of the age distribution of the population in North and South Carolinas. About 45% of DEP treatment respondents are 65 years of age or older. About 44% of DEP control customers are included in that age bracket as well. This is in comparison to U.S. Census estimates that 16% of the population of the Carolinas falls into the same age bracket. Therefore, Duke Energy should interpret the responses of this survey as representing an older group of customers than their customer base overall. Residents of multi-family homes would expected to be younger, on average, and would be hypothesized to report higher rates of engagement with Duke Energy's online content.

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Figure 4-25: Portion Likely to Check Duke Energy Website prior to Purchasing Major Home Equipment - DEP
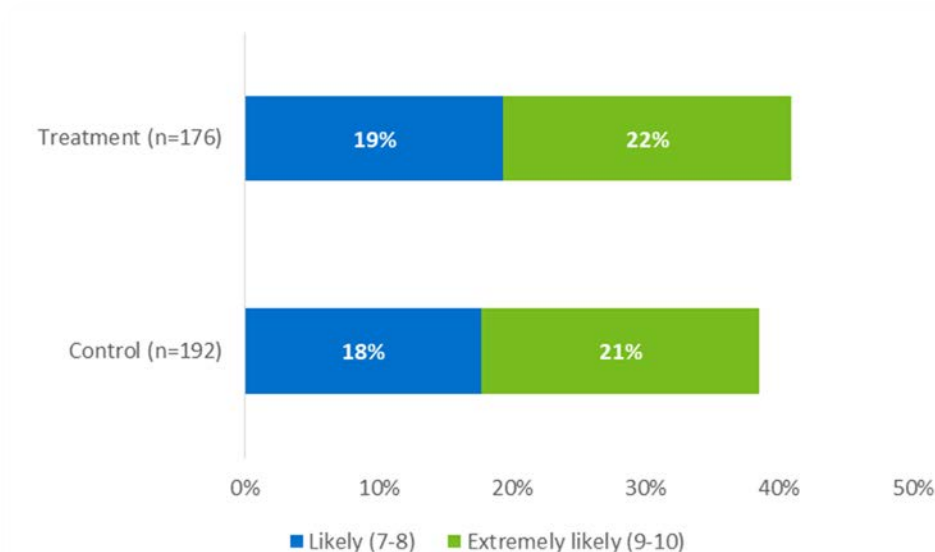
Reported Energy Saving Behaviors

Treatment and control customers track information (bills and usage) related to their household's energy usage in the following ways (Figure 4-26):

- Seventy-one percent of the treatment customers and 69% of the control customers reported tracking the total amount of the bill. The difference is not statistically significant at the 90% level of confidence.

- Sixty-nine percent of the treatment group and control group, respectively, compared usage to previous months. The difference is not statistically significant.

- Sixty-six percent of the treatment respondents and 56% of the control respondents compared usage to the same month from last year. The difference in responses here between treatment and control groups are statistically significant at the 90% level of confidence.

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Figure 4-26: "Which of the Following Do you Do with Regard to Your Household's Energy Use?" - DEP
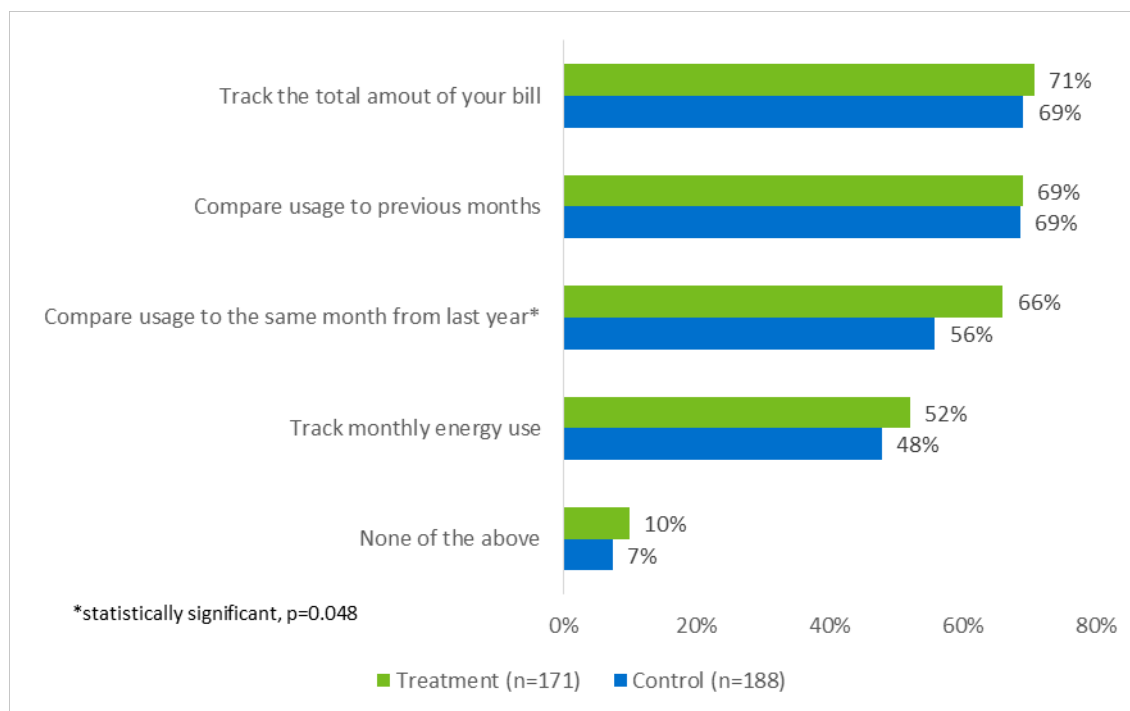
In general, treatment customers were more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (71% to 60%; p = 0.008).

Specifically, the treatment group was more likely to turn off lights in unused or outdoor areas, adjust heating or cooling settings to save energy, fully load dishwasher, wash clothes in cold water and use a portable fan or ceiling fan for cooling than treatment group, as shown in Figure 4-27. These differences are statistically significant at the 90% level of confidence.

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Figure 4-27: Reported Energy Saving Behaviors - DEP

Behavior	Treatment	Control
Turn off lights in unused or outdoor areas (Control n=187, Treatment n=312)*	69%	59%
Adjusted heating or cooling settings to save energy (Control n=188, Treatment n=309)**	68%	58%
Maintain heating or cooling equipment for more efficient operation (Control n=184, Treatment n=307)	62%	57%
Fully load clothes washer (Control n=184, Treatment n=308)	59%	53%
Fully load dishwasher (Control n=174, Treatment n=288)***	57%	45%
Unplug or shut down household electronics when not in use (Control n=187, Treatment n=308)	50%	44%
Wash clothes in cold water (Control n=184, Treatment n=309)****	56%	41%
Use a portable fan or ceiling fan for cooling instead of an air conditioner (Control n=186, Treatment n=306)*****	52%	41%
Reduced water heater temperature to save energy (Control n=180, Treatment n=302)	28%	23%
Other (Control n=129, Treatment n=184)	21%	22%

*statistically significant, p=0.025
**statistically significant, p=0.024
***statistically significant, p=0.011
****statistically significant, p=0.002
*****statistically significant, p=0.017

Ninety-three respondents (treatment and control customers in total) reported other energy savings actions as free form text. Nexant categorized these actions and the results are shown in Figure 4-28. The most commonly reported action, mentioned by 30 respondents, pertains to HVAC/AC/Heating system, such as installing a new HVAC system.

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Figure 4-28: Distribution of Other Energy Savings Behaviors - DEP
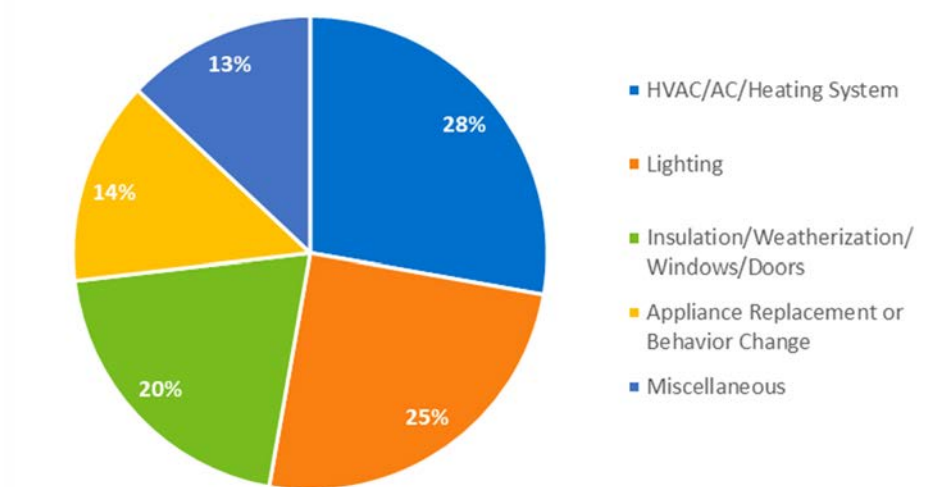
Reported Energy Efficiency Improvements Made

Respondents were provided with a list of energy efficiency improvements and asked if they had done each one in the past year. The treatment group had significantly higher percentages of customers who reported purchasing ENERGY STAR certified home electronic equipment, installing energy-efficient kitchen or laundry appliances, installing energy-efficient heating/cooling equipment, installing programmable thermostat or "smart" thermostat, and adding insulation to attic, walls, or floors than the control customers did (Table 4-18).

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Table 4-18: Portion Indicating They had Made Each Energy Efficiency Upgrade - DEP

Upgrade	Control	Treatment
Install energy-efficient lighting (Control n=187, Treatment n=306)	50%	57%
Caulk or weatherstrip (windows or doors) (Control n=186, Treatment n=301)	35%	38%
Purchase ENERGY STAR certified home electronic equipment (a television, for example) (Control n=178, Treatment n=289)*	35%	45%
Install energy-efficient kitchen or laundry appliances (Control n=185, Treatment n=295)**	30%	45%
Install energy-efficient heating/cooling equipment (Control n=179, Treatment n=297)***	29%	38%
Install energy-efficient water heater (Control n=178, Treatment n=293)	28%	32%
Install programmable thermostat or "smart" thermostat (Control n=182, Treatment n=300)****	26%	36%
Replace windows or doors with more energy-efficient types (Control n=184, Treatment n=301)	22%	26%
Add insulation to attic, walls, or floors (Control n=180, Treatment n=299)*****	20%	28%

*statistically significant, p=0.049
**statistically significant, p=0.001
***statistically significant, p=0.054
****statistically significant, p=0.02
*****statistically significant, p=0.048

Behavior and Upgrade Category Variables

To examine broader patterns within the survey responses that cover many specific cases of energy saving behavior and upgrades, participant responses to the behavior and upgrade responses were combined into their respective categories, and were also combined into end-use categories. As shown in Table 4-19, treatment group respondents were significantly more likely to engage in energy efficiency behaviors and improvements, and also undertook significantly more energy efficiency behaviors and upgrades. These results demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers in DEP.

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Table 4-19: Percent of Households That Had Undertaken Energy Efficiency Actions - DEP

Behaviors/Improvements	Treatment Group	Control Group
Any Energy Efficiency Behavior (Treatment n=31, Control n=190)*	71%	60%
Average Number of Behaviors**	5.03	4.28
Any Energy Efficiency Improvements (Treatment n=313, Control n=189)***	70%	57%
Average Number of Improvements****	3.28	2.67

*statistically significant, p=0.008
**statistically significant, p=0.022
***statistically significant, p=0.003
****statistically significant, p=0.018

Further, Table 4-20 shows the proportion of respondents that had undertaken at least one behavior or upgrade in each end use category. In all nine categories, treatment group members were significantly more likely to have undertaken at least one of these activities. These results further demonstrate that MyHERs have increased energy efficiency behaviors in treatment customers.

Table 4-20: Percent of Households That Had Undertaken Energy Efficiency Actions, by End Use Category - DEP

Behaviors/Improvements	Treatment Group	Control Group
Water Heating Behaviors/Upgrades (Treatment n=315, Control n=189)*	70%	59%
Water Heating Behaviors (Treatment n=315, Control n=187)**	70%	58%
Space Heating Behaviors/Upgrades (Treatment n=315, Control n=190)***	71%	60%
Space Heating Behaviors (Treatment n=315, Control n=190)****	71%	60%
Space Heating Upgrades (Treatment n=309, Control n=185)*****	49%	37%
Lighting Behaviors/Upgrades (Treatment n=314, Control n=190)******	71%	60%
Electronics and Appliances Behaviors/Upgrades (Treatment n=315, Control n=189)*******	68%	53%
Electronics and Appliances Upgrades (Treatment n=306, Control n=186)********	54%	43%
Sealing and Insulation Behaviors/Upgrades (Treatment n=306, Control n=187)*********	52%	42%

*statistically significant, p=0.001
**statistically significant, p=0.007
***statistically significant, p=0.01
****statistically significant, p=0.01
*****statistically significant, p=0.009
******statistically significant, p=0.011
*******statistically significant, p=0.001
********statistically significant, p=0.016
*********statistically significant, p=0.043

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Customer Motivation and Awareness

The control group and treatment groups report similar levels of motivation to save energy. Eighty-two percent of control customers and treatment customers respectively, indicated that knowing they are using energy wisely is important or "important" or "extremely important". (Figure 4-29). The reported percentage for the Treatment group differs from that in the figure due to rounding.

Figure 4-29: "How Important Is It for You to Know if Your Household is Using Energy Wisely?" - DEP
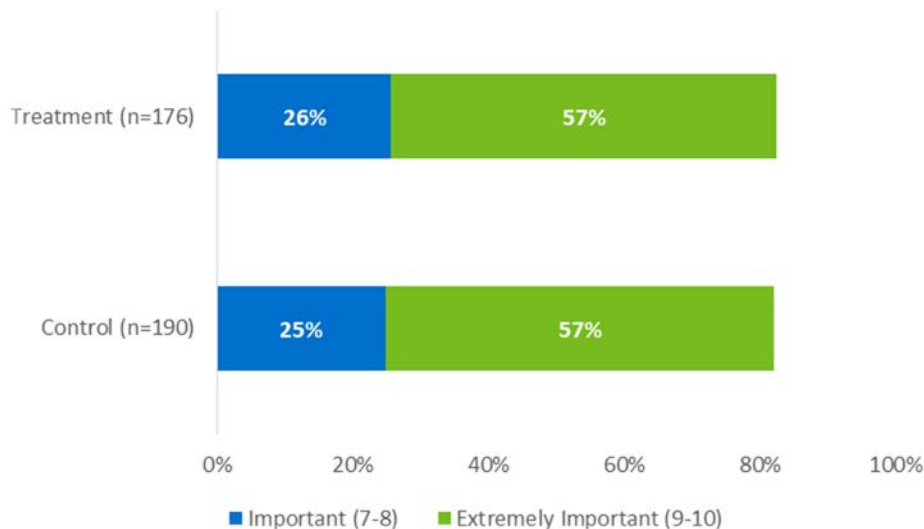
Customers were asked to rate, on a scale of 0 to 10, the importance of various reasons for why they might try to reduce their home's energy use. The strongest motivation for both groups is saving money on their energy bills, where 91% of treatment respondents and 90% of control respondents reported that saving money on their energy bills was "important" or "extremely important". Eighty-four percent of control respondents and 85% of treatment respondents, respectively, indicated that "avoiding waste" was important" or "extremely important" to them. Eighty-one percent of both treatment customers and control customers reported that "conserving energy resources" was important" or "extremely important". Seventy-nine percent of treatment customers and 77% of control customers reported that "helping the environment" was "important" or "extremely important". Those differences between the treatment and control group are not statistically significant. Figure 4-30 contains the frequency of responses to this question, shown as a percentage for both the treatment and control group.

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Figure 4-30: "Please Indicate How Important Each Statement Is to You" - DEP
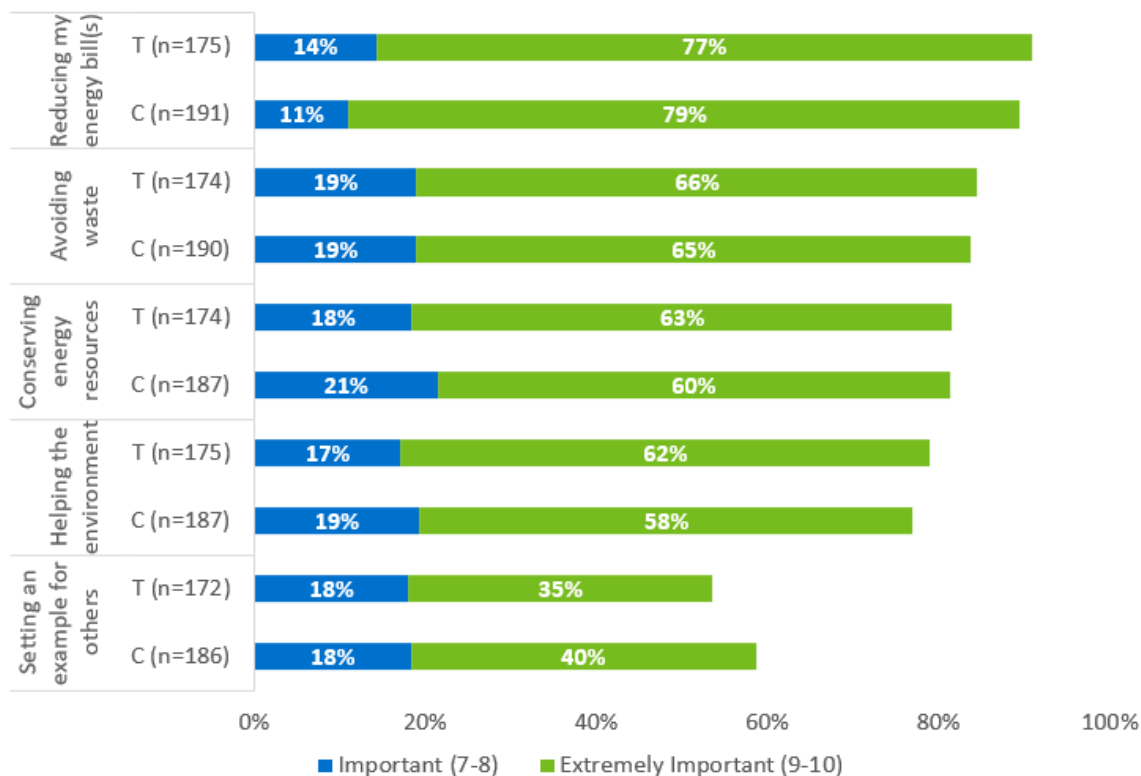
As indicated by Figure 4-31, 67% of treatment customers rated themselves above a seven on a 0-10 point scale of knowledgeability of ways to save energy, while 62% of control group customers rated themselves this way. The difference is not statistically significant at the 90% level of confidence.

Figure 4-31: "How Would You Rate Your Knowledge of the Different Ways You Can Save Energy in Your Home?" - DEP
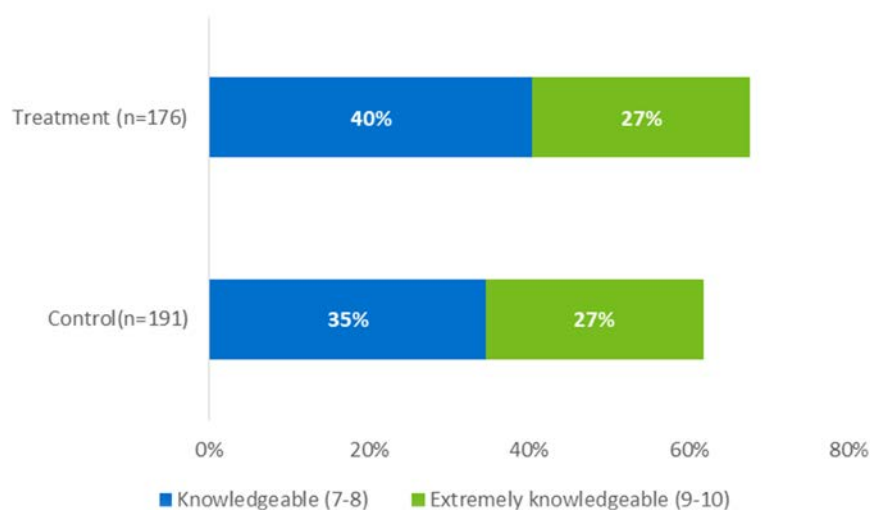
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Treatment respondents that took the treatment-only survey were asked how useful each MyHER feature was to their homes. A similar question was asked of both control group and treatment group respondents who took the primary survey rephrased to ask them how useful they *might expect* that information to be. Table 4-21 presents results of the portion, rating each item a "7" or higher on an 11-point scale of the hypothetical usefulness from the control and treatment customers who took the primary survey, and Table 4-22 presents the comparison results between the actual usefulness of each item rated by treatment customers (treatment-only survey) and the hypothetical usefulness rated by control customers in the primary survey).[14]

The results from the hypothetical usefulness rating (Table 4-21) did not find statistically significant differences in expected usefulness of information that is found on MyHER reports. Comparisons between the responses of customers in the treatment-only survey and control customers in the primary survey show that treatment customers respond differently to questions about information presented in MyHERs if the questions are asked in the context of the actual MyHER reports, however the response patterns show some limited significant separation between treatment and control customers in terms of usefulness of report content: Table 4-22 shows that control customers were significantly more likely to report that "Tips to help you save money and energy", "Information about services and offers from Duke Energy", and "Comparison to similar homes" would be useful than treatment customers reporting that they are actually useful. This finding suggests that there may be an opportunity to improve the presentment of this information in MyHERs.

Table 4-21: Hypothetical Usefulness of HER Features Treatment and Control - DEP

HER Feature	Control Group_Primary Survey	Treatment Group_Primary Survey
Tips to help you save money and energy	73% (n=188)	72% (n=173)
Graphs that display your home's energy use over time	72% (n=185)	73% (n=174)
Information about services and offers from Duke Energy	68% (n=186)	67% (n=172)
Examples of the energy use associated with common household items	67% (n=184)	67% (n=173)
Your home's energy use compared to that of similar homes	66% (n=183)	59% (n=173)
Customized suggestions for your home	60% (n=183)	66% (n=172)

[14] The implementation of a treatment-only survey, in addition to a primary survey provided to both treatment and control customers, afforded an opportunity to test the responses of treatment customers to a question asking about a MyHER feature they have actually seen vs. asking generally about how useful the information is (outside of the context of MyHER). This test leads us to the conclusion that the way customers are asked about this question matters and we recommend that in future surveys, MyHER treatment customers see questions about report content placed specifically in the context of them having seen the content in their reports, as opposed to in the hypothetical.

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Table 4-22: Usefulness or Hypothetical Usefulness of HER Features Treatment and Control - DEP

HER Feature	Control Group_Primary Survey	Treatment Group_Treatment Only Survey
Tips to help you save money and energy*	73% (n=188)	64% (n=146)
Graphs that display your home's energy use over time	72% (n=185)	73% (n=147)
Information about services and offers from Duke Energy**	68% (n=186)	54% (n=145)
Examples of the energy use associated with common household items	67% (n=184)	60% (n=146)
Comparison to similar homes***	66% (n=183)	46% (n=146)
Customized suggestions for your home	60% (n=183)	54% (n=147)

*statistically significant, p=0.073
**statistically significant, p=0.014
***statistically significant, p=0.000

Barriers to Customers Undertaking Energy Savings Actions

When asked the reasons why customers might not be able to save as much as energy as they would like, there were no statistically different response patterns between treatment and control customers, which indicates that MyHER is not making a measurable change in the potential barriers mentioned in this survey. The most commonly reported barrier is "the initial cost of energy efficient equipment is too high" (Figure 4-32): 54% of treatment respondents reported this as a barrier and 50% of control respondents did so as well. The least-commonly cited barrier was lack of expertise: 34% of treatment customers cited lack of expertise as a barrier as did 37% of control customers. The differences are not statistically significant.

Figure 4-32: Barriers to Customers Undertaking Energy Savings Actions - DEP
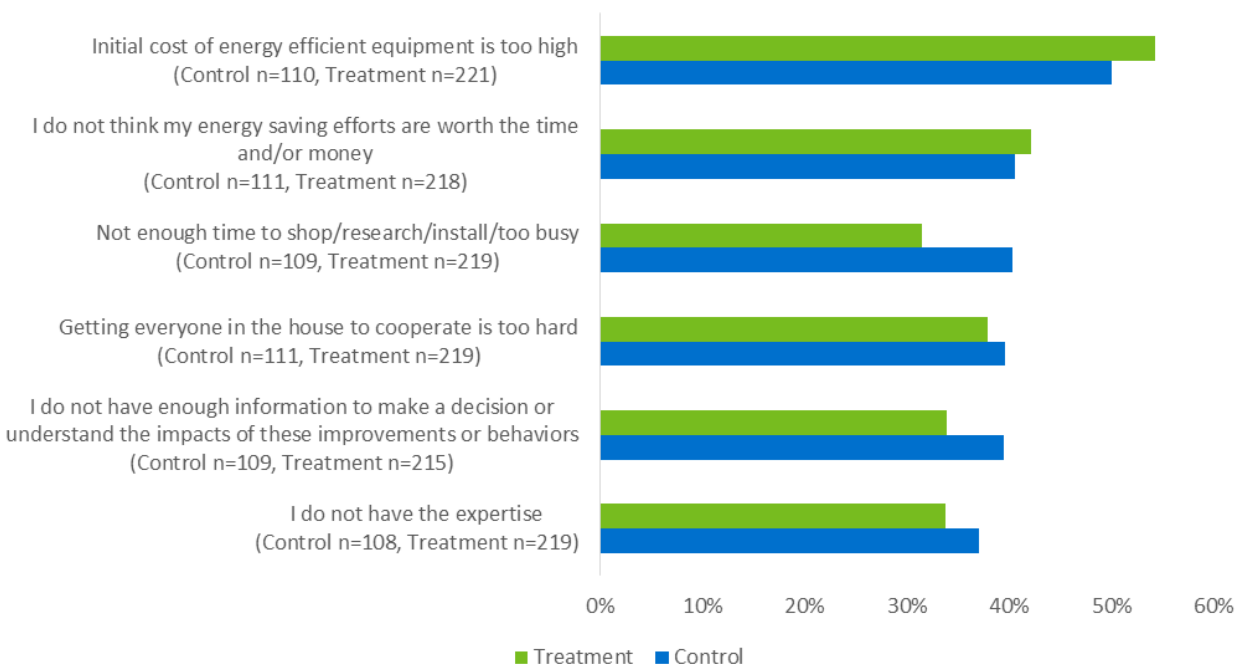
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Suggestions about Duke Energy Improving Service Offerings

The survey provided an open-ended question to elicit suggestions about Duke Energy improving its service offerings to help customers reduce energy use. Only 22% (116 of 539, treatment and control customers in total) offered suggestions, including fourteen who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 44 of the 116 with suggestions, reflected a desire for more energy savings information, programs, free light bulbs, and more incentives:

- *"They can make available those light bulbs, to us senior citizens that don't use computers. So we can order them"*
- *"Suggestions how to improve energy and reduce bill"*
- *"home energy inspections and a list of energy saving products that can be used to lower monthly costs"*
- *"Provide information regarding the amount of energy it takes to run dishwashers, lamps, televisions..."*
- *"Provide more rebates for large ticket items"*

Other comments centered on other suggestions, such as better communication, reducing price/providing senior and disability discounts, etc. Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-23.

Table 4-23: Suggestions about Duke Energy Improving Service Offerings - DEP

Suggestion	Count	Percent of Respondents Mentioning (n=116)	Percent of Total Mentions (n=137)
Provide more energy savings information, programs, free light bulbs and more incentives	44	38%	32%
Better communication	26	22%	19%
Reduce price/provide senior and disability discounts	21	18%	15%
Miscellaneous	16	14%	12%
Appreciation	14	12%	10%
Express Frustration	10	9%	7%
Reduce power outages	4	3%	3%
Provide more detailed info in MyHER / offer MyHER to Townhomes / do more surveys	1	1%	1%
Improve website	1	1%	1%

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Evidence of MyHER Effects

As noted above, while formal statistical testing found a number of differences among treatment and control group households for individual questions, the Nexant team sought to understand if the overall pattern of survey responses differed among treatment and control households. To do this, we categorized each survey question by topic area and then counted any survey item in which the treatment households provided a more positive response than the control households. Table 4-24 presents the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category. A response is considered "favorable" if the treatment group gave a response that is consistent with the program objectives of MyHER.

Table 4-24: Survey Response Pattern Index - DEP

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-saving Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	10	11	91%
Barriers of Customer Not Undertaking Energy Savings Actions	4	6	67%
Customer Satisfaction with Duke Energy	2	4	50%
Total	**40**	**49**	**82%**

Nexant's approach consists of the following logical elements:

- Assume the number of positive responses between treatment and control customers will be equal if MyHER lacks influence;

- Count the total number of topics and questions asked of both groups – there are seven topic areas and 49 questions;

- Note any item for which the treatment group outperformed the control group – the treatment group outperformed the control group in 40 questions, or 82% of the total questions;

- Since this value is more than 50% we can conclude that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey.

- Considering these five areas, calculate the probability that the difference in response patterns is due to chance, rather than an underlying difference in populations – 0% (p-

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value = 0.000). Since this probability is less than 10%, we reject the null hypothesis (that the number of positive responses for treatment and control customers is equal) at the 90% level of confidence.

Because this analysis compares the response patterns between the treatment and control group, if the MyHER program did not influence customers, one would expect the treatment group to "score higher" on roughly half of the questions. In other words, if the MyHER is not influencing treatment group customers, there is a 50/50 chance that they will "outperform" the control group as many times as not. For a more detailed description of the index framework, see Appendix G.

Respondent Demographics

Majority of all respondents—93% of treatment group customers and 88% of control group customers—own their residence. This difference is statistically significant. More than half of households surveyed have two or fewer residents, but about 22% of treatment households and control households respectively, have four or more residents. There are no statistically significant differences in the distribution of age of homes assigned to the treatment and control groups (Figure 4-33) (chi-squared test).

Figure 4-33: "In What Year Was Your Home Built?" - DEP
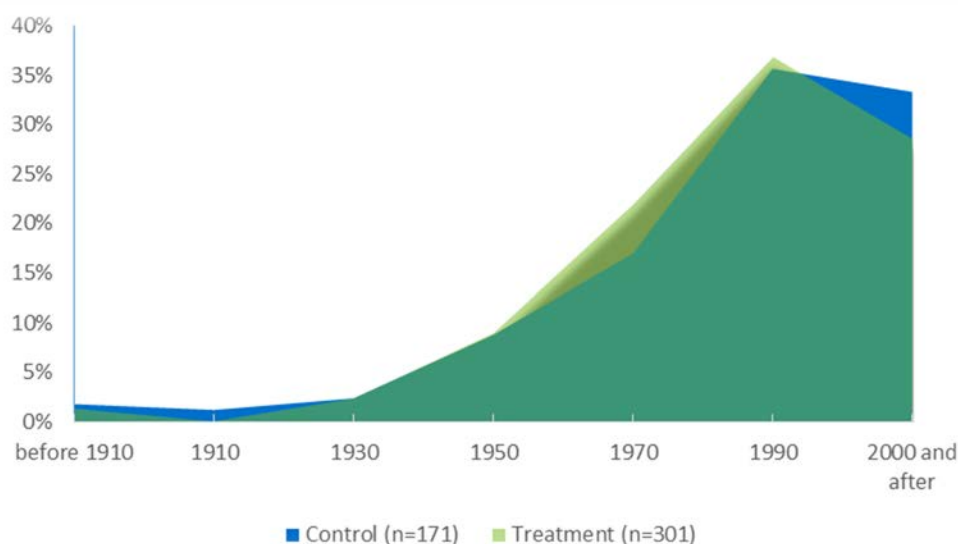
Figure 4-34 shows distribution of home square footage is similar between control and treatment households. The average square footage above ground is 2,022 for control households and 2,110 for treatment households.

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Figure 4-34: How many square feet is above ground living space? - DEP
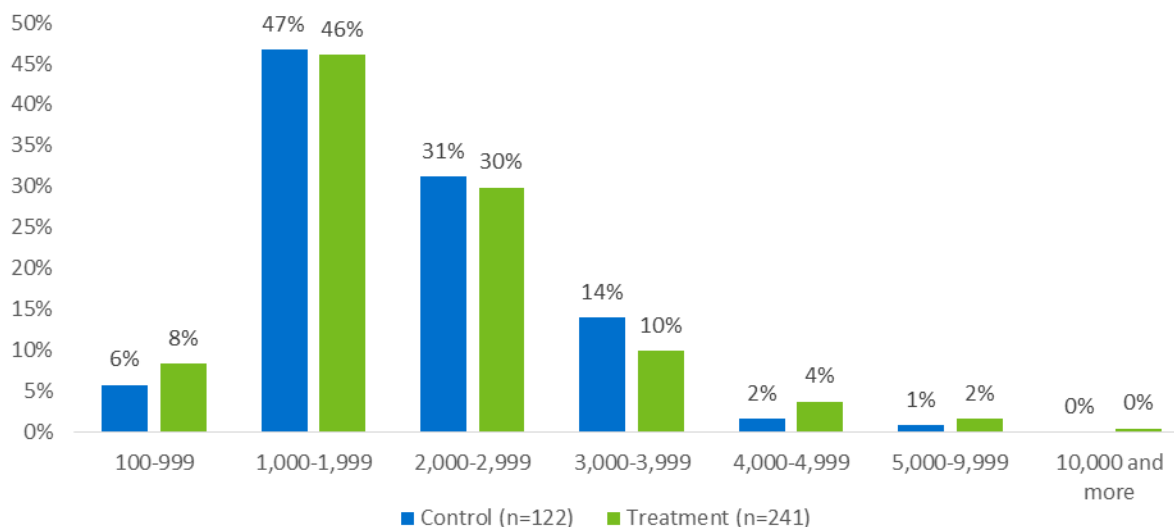
Respondent ages are relatively close to those reported by the U.S. Census American Community Survey (ACS) for Carolinas. The lowest age category (25-34) is often underrepresented when sampling based on residence in single family homes, given that many members of that population are in apartments, dormitories, or living with other family members. This common underrepresentation is true in this survey study, as well. The average age is 61 for control group respondents and 62 for treatment group respondents (see Table 4-25).

Table 4-25: Respondent Age Relative to American Community Survey - DEP

Age	Treatment Group (n=320)	Control Group (n=176)	2017 American Community Survey_Carolinas[15]
25-34	3%	3%	13%
35-44	14%	9%	13%
45-54	19%	18%	13%
55-64	19%	26%	13%
65 and over	45%	44%	16%

Figure 4-35 shows the primary heating fuel type used in control and treatment customers' households. More than half of treatment (58%) and control (59%) customers use electricity in

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[15] American Community Survey (ACS) is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.
https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_SPL_K200104&prodType=table

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their households for heating. Thirty-two percent of treatment customers and 35% of control customers use natural gas for heating.

Figure 4-35: Primary Heating Fuel in Households - DEP
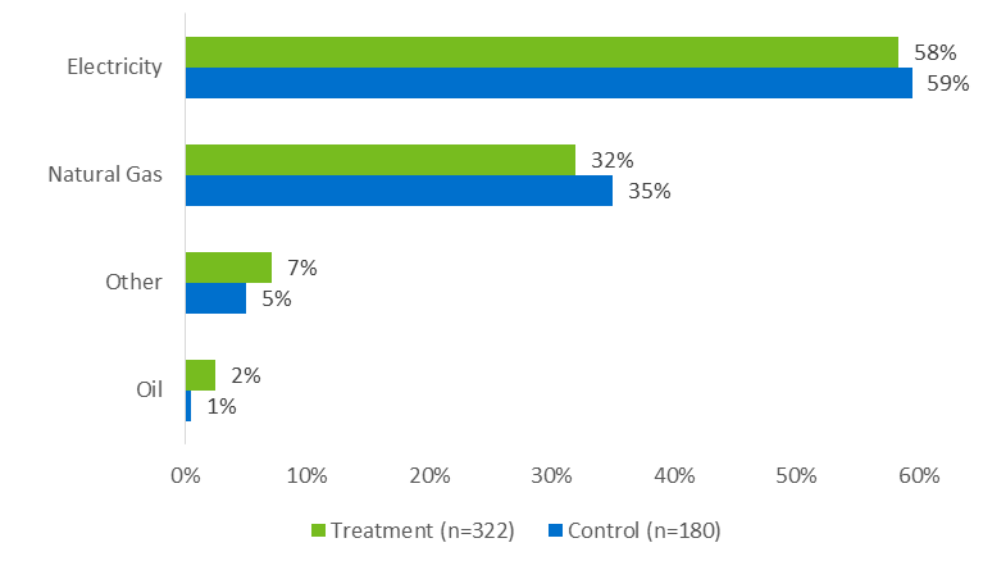
4.2.3.2 Treatment Households: Experience and Satisfaction with MyHER - DEP

A large majority of treatment household respondents, 94%, (160 of 170) recalled receiving at least one of the MyHER reports.

The survey asked those that could recall receiving at least one MyHER report if they could recall how many individual reports they had received "in the past 12 months" (Figure 4-36). The survey launched in January 2019, which means that most recipients would have received 8 MyHERs in the year since February 2018. Twenty-six percent (38 of 147) responded that they received 11 to 12 home energy reports in the past 12 months. The scattered distribution of responses related to recall is consistent with the difficulty of recalling an exact number of reports, however the question is valuable for grounding respondents in the experience of receiving a MyHER before asking them more specific questions about the document.

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Figure 4-36: Reported Number of MyHERs Received "In the past 12 months" (n=147) - DEP
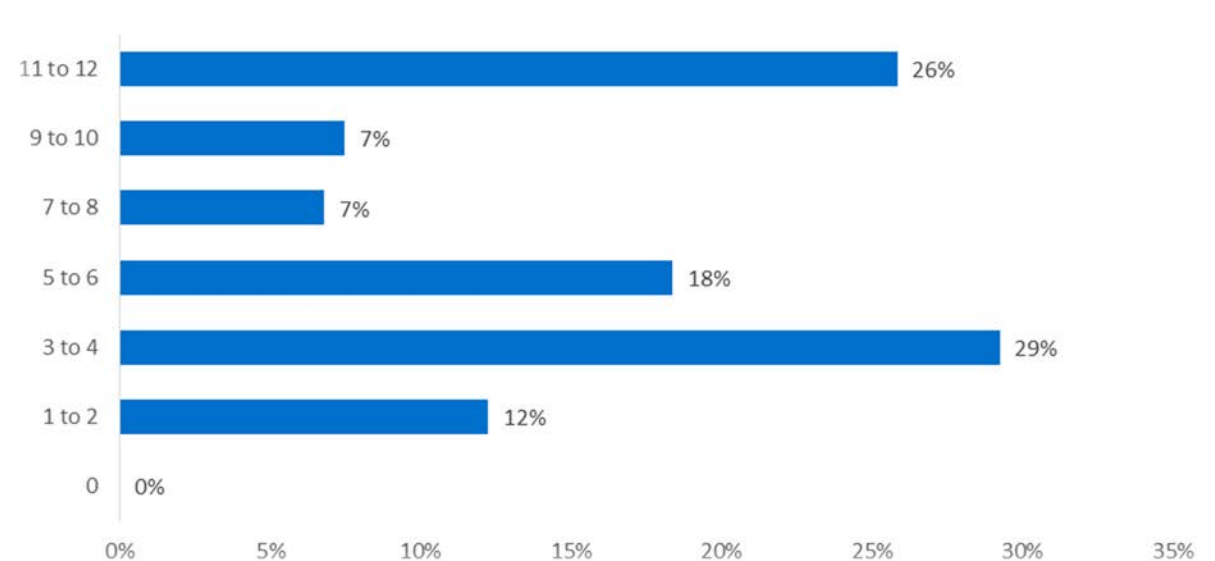
Survey respondents indicated high interest in the MyHER reports. As shown in Figure 4-37, when asked how often they read the reports, 94% of respondents indicated they "always" or "sometimes" read the reports. Ten respondents (6%) indicated they do not read the reports.

Figure 4-37: How Often Customers Report Reading the MyHER (n=159) - DEP

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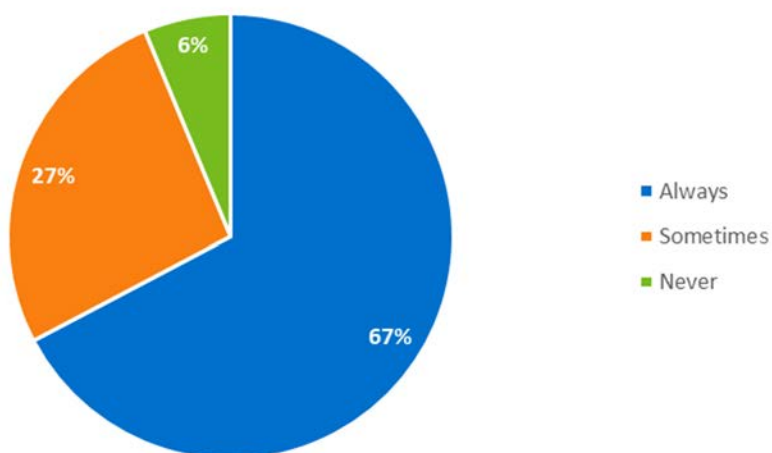
Eighty percent (105 of the 132 respondents that provided a rating) reported being "somewhat" or "very" satisfied with the information contained in the reports (Figure 4-38). The survey asked a further question to the respondents of why they said so: sixty-two of the satisfied respondents provided reasons. Among customers who gave the highest satisfaction ratings, the most common comments on the MyHERs described the reports' ability to engage the customer and provide greater awareness. The customers who reported being somewhat satisfied most often simply described the reports as "useful."

Figure 4-38: Satisfaction with the Information in MyHER Reports (n=132) - DEP
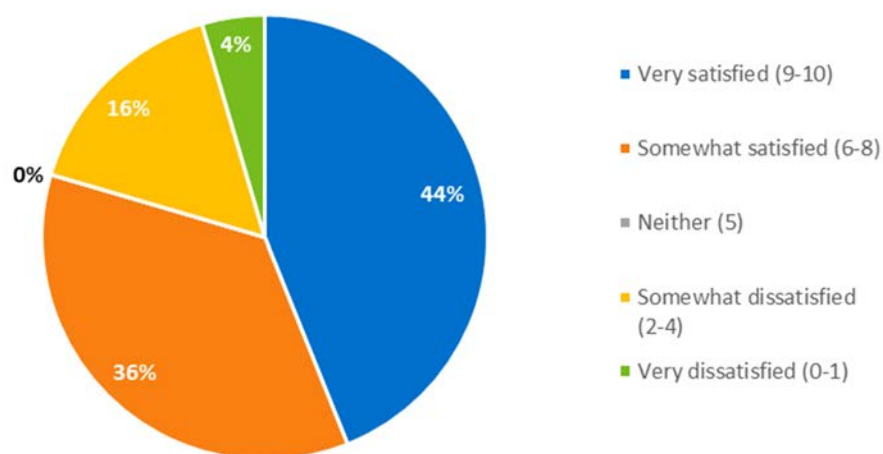
When asked to rate their agreement with a series of statements about MyHERs on a scale of 0 to 10, recipients largely agreed that the reports helped them understand their home's energy use, with 72% of respondents rating their agreement a seven or higher on a 0-10 point scale, and that they use the report to gauge how successful they are at saving energy (65% rating a seven or higher). Sixty percent of respondents agreed that the reports provided the details they needed to understand their home's energy usage. Respondents provided weaker agreement to statements about the pertinence of the tips provided to their homes and whether they have taken actions to use less energy than they would not have since reading MyHERs. A relatively small percentage (16%) agreed with the statement that the information provided is confusing. (Figure 4-39).

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Figure 4-39: Level of Agreement with Statements about MyHER (0-10 Scale) - DEP
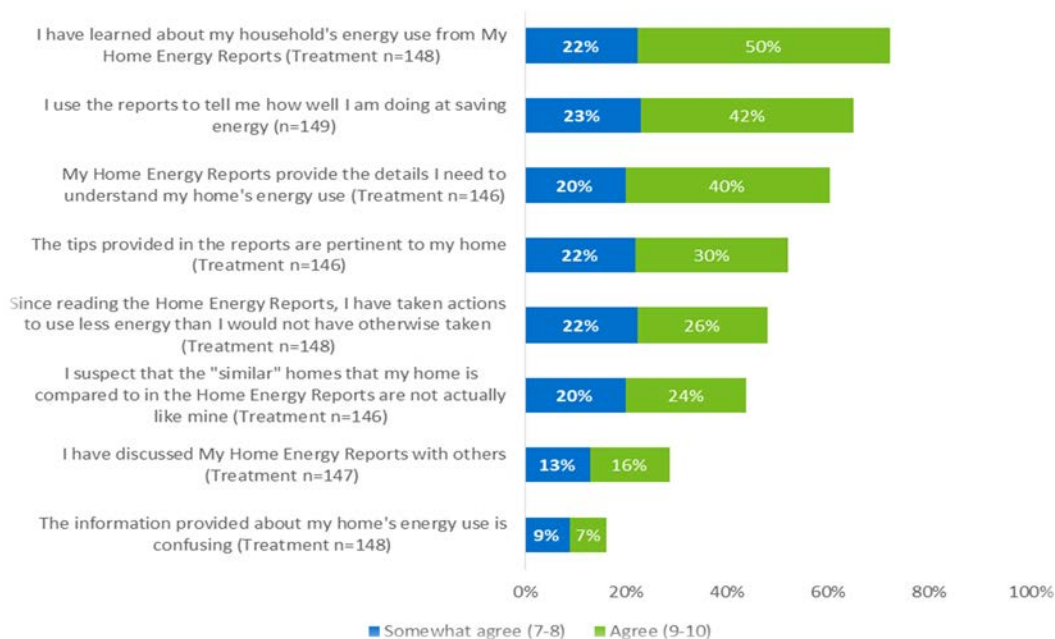
The survey provided an open-ended question to elicit suggestions about potential improvements to MyHER among those that had reported reading at least one report. Only 43% (64 of 149) offered suggestions, including six who offered only appreciative comments. Among those offering suggestions for improvement, the most common request, mentioned by 23 of the 64 with suggestions, reflected a desire for more specific information or details about their home and specific actions they should take. Some of these requests reflected interest in understanding at a more granular level how their home uses energy and energy consumption information related to appliances:

- "*How is energy distributed amongst outlets, appliances, etc.*"

- "*More specific about what electronics use the most energy so I can lower the usage*"

- "*Hours of use, including hours of the day, compare to previous months and or years*"

- "*Maybe by specifying where exactly do we need to focus in order to bring the bill payment down*"

- "*Provide size and age of houses compared to*"

Other comments centered on other suggestions (such as providing free energy assessment, etc.), disbelief in the relevance of comparison homes, and a few respondents that simply did not see value in the reports. Responses coded as recommending production changes focus on changing the delivery method of MyHER reports as follows:

- "*Make all these energy reports available online, so that consumer can view it any time*"

- "*Make it available online...*"

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Nexant categorized these suggestions on the general basis of their content; the results are presented in Table 4-26.

Table 4-26: Distribution Suggestions for Improvement (Multiple Responses Allowed) - DEP

Suggestion	Count	Percent of Respondents Mentioning (n=64)	Percent of Total Mentions (n=75)
Provide more specific information or details	23	36%	31%
Don't believe comparison/accuracy	16	25%	21%
Other suggestions (such as providing information on solar panels, etc.)	8	13%	11%
Appreciate the Home Energy Report	9	14%	12%
Address unique home/circumstances	5	8%	7%
Expressed frustration	5	8%	7%
Provide discounts/incentives/equipment upgrades	5	8%	7%
Change production (mail, paper, format)	3	5%	4%
Don't see value/dislike	1	2%	1%

Treatment households were also asked questions that focused on the awareness and use of MyHER Interactive, revealing low awareness of the online Interactive platform:

▪ Only 35% of treatment customers are aware of MyHER Interactive;

▪ Among aware customers, 86% reported that they had not signed up to use MyHER Interactive; and

▪ When asked why they haven't signed up to use MyHER Interactive, 23% of respondents reported that they were very busy, 23% reported that they were not interested in it, 18% reported that they did not have either a computer or internet access, and another 10% reported that they actually did not know about it.

4.3 Summary of Process Evaluation Findings

In-depth interviews with MyHER implementation staff reveal that the DEP and DEC MyHER program has benefited from a number of enhancements to the program and improvements in process and program management, and continues to operate effectively. Electronic MyHERs are now sent via email to all treatment customers that have provided Duke Energy with an email address. This enhancement means that report production is now a year-round process since the email reports are sent on a monthly basis for each month of the year. The MyHER report template was also refreshed to increase visual appeal and value to the customer. The new template includes the addition of a module that presents energy usage disaggregated by end-use category, on a looking-forward basis for the month ahead. Also, the template update

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included the addition of images to the free form text (FFT) module of the reports. Lastly, the content and graphics of the email template was changed. There has also been increased enrollment for the MyHER Interactive online portal, which is emerging as a priority for Duke Energy and Tendril. The MyHER user experience is expected to be further enhanced in the future as the rollout of AMI meters and increased availability of AMI data continues.

From the backoffice perspective, Tendril, Duke Energy's MyHER program provider, implemented a number of process improvements. Tendril migrated their computational platform to Amazon Web Services (AWS), significantly reducing the time required to process data and generate batches of reports, and developed a pre-production platform to enable Duke Energy to review PDF drafts of MyHERs prior to promotion into production, which realized process efficiencies for Tendril. Additionally, Tendril has made progress on updating the "action tips" section of the report to "smart actions", by introducing the ability for these tips to be targeted to particular groups of MyHER recipients for which the tips are most appropriate. To date, roughly 20% of these tips are now "smart actions". Tendril also transitioned email MyHER production to Hypertext Markup Language (HTML) format to provide greater flexibility in Tendril's production processes.

Duke Energy and Tendril continue to collaborate for success through joint weekly status meetings, monthly operations meetings, and quarterly governance meetings. Working together, monthly key performance indicators (KPIs) such as in-home dates and percentage of treated customers treated are monitored. These meetings provide the venue for brainstorming and roadmapping activities as well as monitoring Duke Energy's MyHER product request list. This list is a priority for Duke Energy, and currently tracks about 25 items. Tendril has implemented an internal HER Improvement team to address the items on the list, and has made progress in this endeavor. Since the prior evaluation, Tendril has improved their performance in product quality, which is rigorously monitored by Duke Energy staff. These improvements have been attributed to a stable operations team at Tendril which has also expanded to include a quality control engineer. This engineer has designed and implemented automated QC checks, using AWS and other software, that have reduced errors in report production, increased the speed of the process, and reduced the staff necessary to manage it. This process will continue to change in 2019, as Tendril implements their HOMERS platform, allowing for increased efficiency in report production and quality control, as well as the implementation of the "self-serve" FFT tool that will eventually allow Duke Energy to produce and manage FFT content. This tool will eliminate the need for the highly resource-intensive collaboration procedure that has characterized FFT content production to this point.

Additionally, Tendril has also adopted a "Batch 0" strategy to implement significant changes to the MyHER reports on a test batch of data prior to producing a live batch to be mailed to customers. Batch 0 reports are tested for quality by both Tendril and Duke Energy and have allowed unexpected problems to be surfaced early and also to allow Duke Energy to fine tune the newly implemented changes. Improved product quality has resulted in fewer problems turning up in the quality control process.

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In general, there was a strong emphasis on the development of procedures and strategies to prevent problems in the MyHER production process including a redesigned QC process, progress on the product request list, the management of messaging calendars, and the preparation for the rollout of HOMERS.

Though there has been continued success in communications and data transfers, there were some problems emerging from the process of reconciling customer email lists that resulted in the loss of emails that had been updated by Duke Energy customers, as well as some difficulty that Tendril experienced with importing AMI data from Duke Energy. The latter problem is being remedied with the implementation of a new data ingester, while the former is being addressed by a procedural change until the reconciliation process is automated. Other areas that were noted for potential improvement include improving the MyHER login requirements and Interactive profile questionnaire. The latter improvement is to address a larger concern among customers that the disaggregated energy use figures are not accurate.

Survey Findings - DEC

Surveys of DEC treatment and control customers show that, among treatment group households:

- 93% recalled receiving at least one MyHER and 99% of those indicated that they "always" or "sometimes" read the reports.
- 87% reported being "very" or "somewhat" satisfied with the information provided by MyHERs.
- Only 28% of MyHER recipients are aware of MyHER Interactive, and only 8% of the aware recipients report that they have signed up to use it. When asked why they haven't signed up to use MyHER Interactive, 30% of respondents reported that they were too busy, 22% reported that they were not interested in it, and 9% further reported that they did not know about it.
- Seventy-one percent of respondents strongly agree with the statement "I have learned about my household's energy use from My Home Energy Reports". Very few (12%) strongly agree with the idea that the energy usage information presented by the reports is confusing.
- The most useful features of the reports, as rated by treatment customer respondents, are the graphs that illustrate the home's energy usage over time. The least useful-rated feature is customized suggestions for homes.
- 44% of treatment customers reported that MyHERs spurred them to undertake energy saving actions that they would not otherwise have done.
- Most (72%) respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently questioned the accuracy of the comparison, and requested more specific or detailed information in their MyHERs.

In comparing responses of treatment and control group respondents, there were a number of areas where treatment customers provided responses that more favorably reflected increased

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awareness, engagement, or attitudes towards energy savings opportunities and actions relative to control customers:

- Treatment customers are significantly more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (73% to 63%).

- Treatment group respondents were significantly more likely to have engaged in 7 (out of 10) energy saving behaviors and 1 (out of 9) energy efficiency improvement than control respondents.

An index designed to account for overall survey-wide differences in response patterns found a more positive response pattern (31 positive responses out of a total of 49 questions) for treatment customers in simple frequencies across many facets of the survey. Using standard statistical techniques (specifically, the non-parametric sign test), Nexant calculates the probability of randomly obtaining positive results for 31 of 49 questions is 2% and is not likely due to chance. We conclude that exposure to MyHER is positively affecting customer awareness of, engagement in, and attitudes towards energy savings opportunities and actions. MyHER is also implemented with the goal of increasing customer satisfaction with Duke Energy and its stance on Energy Efficiency. These survey results do not show evidence of a measurable uplift in satisfaction in DEC that can be attributed to MyHER.

Survey Findings - DEP

Surveys of DEP treatment and control customers show that, among treatment group households:

- 94% recalled receiving at least one MyHER and 94% of those indicated that they "always" or "sometimes" read the reports.

- 80% reported being "very" or "somewhat" satisfied with the information provided by MyHERs.

- Only 35% of MyHER recipients are aware of MyHER Interactive, and only 14% of the aware recipients report that they have signed up to use it. When those who hadn't signed up for MyHER Interactive were asked why, 23% of respondents reported that they were too busy, 23% reported that they were not interested in it, 18% reported that they did not have either a computer or internet access, and another 10% reported that they actually did not know about it.

- 48% of treatment-only group members reported that MyHERs spurred them to undertake energy saving actions that they would not otherwise have done.

- Seventy-two percent of respondents agree with the statement: "I have learned about my household's energy use from My Home Energy Reports". Few (16%) strongly agree with the idea that the energy usage information presented by the reports is confusing.

- The most useful features of the reports, as rated by treatment customer respondents, are the graphs that illustrate the home's energy usage over time. The least useful-rated feature is comparison to similar homes.

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- More than half (57%) of respondents had no feedback or suggestions to improve the program. Those that made suggestions most frequently reflected a desire for more specific information or details about their home and specific actions they should take in their MyHERs.

In comparing responses of treatment and control group respondents, there were a number of areas where treatment customers provided responses that more favorably reflected increased awareness, engagement, or attitudes towards energy savings opportunities and actions relative to control customers:

- Treatment customers significantly more likely than control customers to report having undertaken behaviors to reduce household energy use or having made energy efficiency improvements to their home (71% to 60%).

- Treatment group respondents were significantly more likely to have engaged in 5 (of 10) energy saving behaviors and 5 (of 9) energy efficiency improvements than control respondents.

- Treatment group respondents reported significantly higher levels of satisfaction with the information Duke Energy makes available about energy efficiency programs, with the information Duke Energy provides to help customers save on energy bills, and with Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.

An index designed to account for overall survey-wide differences in response patterns finds a more positive response pattern for treatment customers in simple frequencies across the entire survey. Thirty-six out of 40 questions show more favorable responses for the treatment group. Using standard statistical techniques (specifically, the non-parametric sign test), Nexant calculates the probability of randomly obtaining this result is nearly 0% and thus extremely likely due to chance. We conclude that exposure to MyHER is increasing awareness of, engagement in, and attitudes towards energy savings opportunities of treatment customers relative to control customers.

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5   Conclusions and Recommendations

Nexant finds that the MyHER program is an effective channel for increasing customer engagement with energy efficiency and demand side management. The RCT program design facilitates reliable estimates of program energy savings. Further, the energy savings generated by the program are corroborated by survey findings of respondent awareness of, engagement in, and focus on the importance of saving energy. As an additional benefit, Nexant finds that MyHER is a useful tool for enhancing Duke Energy and increases uptake in other Duke Energy efficiency programs. The MyHER program has achieved full deployment among Duke Energy Carolinas and Progress single-family home customers and Nexant recommends that Duke Energy continue to focus on program processes and operations to further increase the efficiency of program delivery.

Duke Energy also launched the MyHER Interactive portal in March 2015. The portal offers additional means for customers to customize or update Duke Energy's data on their premises, demographics, and other characteristics that affect consumption and the classification of each customer. The portal also provides additional custom tips based on updated data provided by the customer. MyHER Interactive sends email challenges to portal users that seek to engage customer in active energy management, additional efficiency upgrades, and conservation behavior. Nexant evaluated the impacts of the MyHER Interactive portal using a matched comparison group because the MyHER Interactive portal was not deployed as a randomized controlled trial (RCT).

5.1   Impact Findings

Nexant estimates that the MyHER program saved a total of 292.2 GWh at Duke Energy Carolinas and 141.1 GWh at Duke Energy Progress during the period June 2017 to May 2018. The confidence and relative precision of the estimate is 90% and 6.4%, respectively for DEC and 9.4% for DEP. This impact estimate accounts for the fact that MyHER increases uptake of other Duke Energy programs; 6.0 kWh has been subtracted from the average household program impact to account for the MyHER uplift in other programs in both DEC and DEP. Without such a correction, those savings (6.0, kWh per household per year) would be double counted by Duke Energy.

Nexant estimates that DEC customers that sign up to use the MyHER Interactive Portal saved an additional 21 kWh per month, representing an additional 1.6% in energy savings during the period June 2017 to May 2018. These savings are statistically significant at the 90% level of confidence and are incremental, or over and above the savings that MyHER alone delivers. However, only a relatively small group of DEC MyHER recipients are signed up to use the portal, as of May 2018 38,190 DEC customers are Interactive users, out of 1,151,896 DEC MyHER recipients overall. It's important to note that since MyHER Interactive portal customers volunteered to participate in the portal product, their savings may not represent the expected

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savings if all customers were assigned to the portal product by default. DEP MyHER participants do not generate statistically significant energy savings during the period June 2017 to May 2018.

5.2 Process Findings

The DEP and DEC MyHER programs are Duke Energy's most mature behavioral programs in terms of delivered energy savings in each jurisdiction. The large volume of data required to generate MyHER and support the program delivery schedule is the primary driver of program activities and focus. Duke Energy and its implementation contractor, Tendril, are successfully managing this process and providing DEP and DEC customers' valuable information for managing home energy consumption.

The DEP and DEC MyHER programs have benefited from a number of process and product management improvements. Careful change management and a stable operations team at Tendril have been key enablers of maintaining a production process that consistently meets MyHER quality control standards.

MyHER participants have been found in this evaluation's customer surveys to display higher levels or incidence of a number of energy savings behaviors, opinions, attitudes, and engagement with energy efficiency. MyHER is also positively affecting customer's perception of Duke Energy's public stance on energy efficiency for DEP, and some aspects of customers' monitoring and tracking household energy consumption habits in both DEC and DEP.

5.3 Program Recommendations

- **Continue the commitment to simultaneous control and treatment assignment.** New assignments to treatment and control groups must be simultaneous and Tendril and Duke Energy should work to add all newly assigned treatment and control groups to their respective statuses in a single billing month, to the extent that is technically feasible.

- **Continue the practice of making assignments of new accounts to MyHER treatment and control groups once a year, or at most, twice a year.** The numbers of Duke Energy customers becoming eligible for the program each year do not facilitate more frequent assignments. This is due to the fact that sufficient numbers of customers must be set aside for the control group each time a group of customers is assigned to treatment in order for the evaluator to be able to measure the energy savings delivered by the new cohort.

- **Increase MyHER participant awareness of Interactive.** The process evaluation finds that current awareness of Interactive among DEP and DEC MyHER participants is very low, so another program objective above actual engagement with Interactive is to more effectively get the word out about its existence.

- **Continue to drive engagement with the Interactive Portal.** MyHER Interactive's ability to deliver measurable energy savings is on the rise, as shown by this evaluation in comparison to the prior DEC evaluation, as well as the MyHER evaluations for other

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Duke Energy jurisdictions completed in the past year. We recommend that Duke Energy continue to drive more MyHER participants to the portal.

- **Continue to operate MyHER with an eye towards change management**. MyHER's implementer Tendril has made great strides in improving quality control performance since the prior evaluation in the automating of this process. Effective change management and stable staffing have been notable contributors to these improvements and they should continue to be emphasized in MyHER program operations, especially as Tendril's new HER production platform, HOMERS (the Home Energy Reporting Service), is rolled out and its implementation is optimized.

- **Continue to prioritize the structuring of the processes and schedules for program elements**. This organization of tasks for elements such as the FFT report module has been a significant success in the operations of the MyHER program and has the made reactive responses to impending deadlines and emergent challenges that characterized these operations in the past much less common. Program staff should seek out additional opportunities for the optimization of program schedules, tasks, and long term goals in this manner.

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Appendix A   Summary Forms

MyHER Carolinas
Completed EMV Fact Sheet

Description of program

Duke Energy offers the My Home Energy Report (MyHER) to residential customers. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to a peer group of similar homes.

Date	July 10, 2019
Region(s)	Carolinas
Evaluation Period	June 2017 – May 2018
Annual kWh Savings	292,174,507 kWh (Report) 7,378,007 kWh (Portal)
Per Participant kWh Savings	247.7 kWh/home (Report) 255.1 kWh/home (Portal)
Coincident kW Impact	0.069 kW/home (Report) 0.071 kW/home (Portal)
Net-to-Gross Ratio	Not Applicable
Process Evaluation	Yes
Previous Evaluation(s)	2017 – Nexant 2014 – TecMarket Works

Evaluation Methodology

Impact Evaluation Activities

- *Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.*

- *The impact estimate is based on monthly billing data and program participation data provided by Duke Energy.*

- *The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program.*

Impact Evaluation Findings

- *Realization rate = 108% for energy impacts; 247.7 kWh per home (Report)*

Process Evaluation Activities

- *337 surveys of treatment customers, 211 surveys for control group customers and staff interviews.*

Process Evaluation Findings

- *93% of MyHER recipients recall receiving the reports.*

- *87% of MyHER recipients are "very" or "somewhat" satisfied with the information provided by the reports.*

- *28% of MyHER recipients are aware of MyHER Interactive.*

- *MyHER produces an uplift in customer awareness of, engagement in, and attitudes towards energy savings.* opportunities and actions

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MyHER Progress
Completed EMV Fact Sheet

Duke Energy offers the My Home Energy Report (MyHER) to residential customers. MyHER relies on principles of behavioral science to encourage customer engagement with home energy management and energy efficiency. The program accomplishes this primarily by delivering a personalized report comparing each customer's energy use to a peer group of similar homes.

Date	July 10, 2019
Region(s)	Progress
Evaluation Period	June 2017 – May 2018
Annual kWh Savings	141,099,476 kWh
Per Participant kWh Savings	201.2 kWh/home
Coincident kW Impact	0.071 kW/home
Net-to-Gross Ratio	Not Applicable
Process Evaluation	Yes
Previous Evaluation(s)	2017 – Nexant

Evaluation Methodology

Impact Evaluation Activities

- *Eligible accounts are randomly assigned to either a treatment (participant) group or a control group. The control group accounts are not exposed to MyHER in order to provide the baseline for estimating savings attributable to the Home Energy Reports. In this randomized controlled trial (RCT) design, the only explanation for the observed differences in energy consumption between the treatment and control group is exposure to MyHER.*

- *The impact estimate is based on monthly billing data and program participation data provided by Duke Energy.*

- *The RCT delivery method of the program removes the need for a net-to-gross analysis as the billing analysis directly estimates the net impact of the program.*

Impact Evaluation Findings

- *Realization rate = 137% for energy impacts; 201.2 kWh per home*

Process Evaluation Activities

- *347 surveys of treatment customers, 192 surveys for control group customers and staff interviews.*

Process Evaluation Findings

- *94% of MyHER recipients recall receiving the reports.*

- *80% of MyHER recipients are "very" or "somewhat" satisfied with the information provided by the reports.*

- *35% of MyHER recipients are aware of MyHER Interactive.*

- *MyHER produces an uplift in customer awareness of, engagement in, and attitudes towards energy savings.* opportunities and actions

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Appendix B Measure Impact Results

Table B-1: DSMore Measure Impact Results

Measure Category	Prod Code	Jurisdiction	Gross Energy Savings (kWh)	Gross Summer Coincident Demand (kW)	Gross Winter Coincident Demand (kW)	Net to Gross Ratio	Net Energy Savings (kWh)	Net Summer Coincident Demand (kW)	Net Winter Coincident Demand (kW)	Measure Life
NC_ My Home Energy Report	HECR	DEC	248	0.0691	N/A	100%	248	0.0691	N/A	1
MyHER Interactive		DEC	255	0.0712	N/A	100%	255	0.0712	N/A	1
NC_ My Home Energy Report	HECR	DEP	201	0.0712	N/A	100%	201	0.0712	N/A	1

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Appendix C   Survey Instruments

Primary Survey

Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.

Not at all Satisfied										Completely Satisfied
0	1	2	3	4	5	6	7	8	9	10

Q2. Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.

	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied
The information available about Duke Energy's efficiency programs.	☐	☐	☐	☐	☐
Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.	☐	☐	☐	☐	☐
The information Duke Energy provides to help customers save on energy bills.	☐	☐	☐	☐	☐

Q3. Have you logged in to your Duke Energy account to do any of the following? Check all that apply.
- ☐ I have never logged in
- ☐ Pay my bill
- ☐ Review energy consumption graphs
- ☐ Look for energy efficiency opportunities or ideas
- ☐ None of the above

Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.

- ☐ Monthly
- ☐ A few times a year
- ☐ Once a year
- ☐ Never

Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?

Not at all Likely										Extremely Likely
0	1	2	3	4	5	6	7	8	9	10

Q6. How important is it for you to know if your household is using energy wisely?

Not at all Important										Extremely Important
0	1	2	3	4	5	6	7	8	9	10

Q7. How would you rate your knowledge of the different ways you can save energy in your home?

Not at all Knowledgeable										Extremely Knowledgeable
0	1	2	3	4	5	6	7	8	9	10

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Q8. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

☐ Yes ☐ No – **Skip to Q12**

Q9. Which actions have been taken?

	Yes	No	Don't Know
Adjusted heating or cooling settings to save energy	☐	☐	☐
Reduced water heater temperature to save energy	☐	☐	☐
Wash clothes in cold water	☐	☐	☐
Fully load clothes washer	☐	☐	☐
Fully load dishwasher	☐	☐	☐
Turn off lights in unused or outdoor areas	☐	☐	☐
Unplug or shut down household electronics when not in use	☐	☐	☐
Maintain heating or cooling equipment for more efficient operation	☐	☐	☐
Use a portable fan or ceiling fan for cooling instead of an air conditioner	☐	☐	☐
Other, please specify:			
Other, please specify:			

Q10. Which energy efficiency improvements have been made?

	Yes	No	Don't Know
Install energy-efficient kitchen or laundry appliances	☐	☐	☐
Install energy-efficient heating/cooling equipment	☐	☐	☐
Install energy-efficient water heater	☐	☐	☐
Replace windows or doors with more energy-efficient types	☐	☐	☐
Caulk or weatherstrip (windows or doors)	☐	☐	☐
Add insulation to attic, walls, or floors	☐	☐	☐
Install energy-efficient lighting	☐	☐	☐
Install programmable thermostat or "smart" thermostat	☐	☐	☐
Purchase ENERGY STAR certified home electronic equipment (a television, for example)	☐	☐	☐

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Q11. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?　　Scale: 0 = Not at all Important; 10 = Extremely Important

	Not at all Important										Extremely Important
Initial cost of energy efficient equipment is too high	0	1	2	3	4	5	6	7	8	9	10
Not enough time to shop/research/install /Too busy	0	1	2	3	4	5	6	7	8	9	10
I do not have the expertise	0	1	2	3	4	5	6	7	8	9	10
I do not have enough information to make a decision or understand the impacts of these improvements or behaviors	0	1	2	3	4	5	6	7	8	9	10
Getting everyone in the house to cooperate is too hard	0	1	2	3	4	5	6	7	8	9	10
I do not think my energy saving efforts are worth the time and/or money	0	1	2	3	4	5	6	7	8	9	10

Q12. Which of the following do you do with regard to your household's energy use? Check all that apply.
- ☐ Track monthly energy use
- ☐ Track the total amount of your bill
- ☐ Compare usage to the same month from last year
- ☐ Compare usage to previous months
- ☐ None of the above

Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household. Scale: 0 = Not at all Useful; 10 = Extremely Useful

	Not at all Useful										Extremely Useful
Your home's energy use compared to that of similar homes	0	1	2	3	4	5	6	7	8	9	10
Tips to help you save money and energy	0	1	2	3	4	5	6	7	8	9	10
Examples of the energy use associated with common household items	0	1	2	3	4	5	6	7	8	9	10
Customized suggestions for your home	0	1	2	3	4	5	6	7	8	9	10
Graphs that display your home's energy use over time	0	1	2	3	4	5	6	7	8	9	10
Information about services and offers from Duke Energy	0	1	2	3	4	5	6	7	8	9	10

Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you. Scale: 0 = Not at all Important; 10 = Extremely Important

	Not at all Important										Extremely Important
Reducing my energy bill(s)	0	1	2	3	4	5	6	7	8	9	10
Helping the environment	0	1	2	3	4	5	6	7	8	9	10
Setting an example for others	0	1	2	3	4	5	6	7	8	9	10
Avoiding waste	0	1	2	3	4	5	6	7	8	9	10
Conserving energy resources	0	1	2	3	4	5	6	7	8	9	10

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Q15. Please indicate your level of agreement with each of the following statements:

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
Duke Energy provides excellent customer service	☐	☐	☐	☐	☐
Duke Energy respects its customers	☐	☐	☐	☐	☐
Duke Energy provides service at a reasonable cost	☐	☐	☐	☐	☐

Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?

☐ Yes   ☐ No – **Skip to Q17**

Q16a. How many **free** light bulbs have you ordered through the Duke Energy website this year? _____

Q16b. How many **discounted** light bulbs have you ordered through the Duke Energy website this year? _____

Q17. How could Duke Energy improve upon its service offerings to help you reduce your energy usage?

_____

_____

_____

Q18. Do you own or rent this residence?   ☐ Own   ☐ Rent

Q19. Including yourself, how many people live in your home? _____

Q20. In what year was your home built? _____

Q21. How many square feet is the above-ground living space? _____

Q22. What is your primary heating fuel?   ☐ Electricity   ☐ Natural Gas   ☐ Oil   ☐ Other

Q23. In what year were you born? _____

Thank you! Please return your completed survey using the enclosed envelope.

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Treatment-only Survey

Q1. Duke Energy sends a personalized report called *My Home Energy Report* to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?

☐ Yes ☐ No – **Skip to Q13**

Q2. About how many *My Home Energy Reports* have you received in the past 12 months?_____ **If zero, skip to Q13**

Q3. How often do you read the *My Home Energy Reports*?

☐ Always ☐ Sometimes ☐ Never – **Skip to Q13**

Q4. How much do you agree or disagree with the following statements about *My Home Energy Reports*?
Scale: 0 = Strongly Disagree; 10 = Strongly Agree

	Strongly Disagree										Strongly Agree
I have learned about my household's energy use from *My Home Energy Reports*.	0	1	2	3	4	5	6	7	8	9	10
I use the reports to tell me how well I am doing at saving energy.	0	1	2	3	4	5	6	7	8	9	10
The tips provided in the reports are pertinent to my home.	0	1	2	3	4	5	6	7	8	9	10
My Home Energy Reports provide the details I need to understand my home's energy use.	0	1	2	3	4	5	6	7	8	9	10
I have discussed *My Home Energy Reports* with others.	0	1	2	3	4	5	6	7	8	9	10
The information provided about my home's energy use is confusing.	0	1	2	3	4	5	6	7	8	9	10
I suspect that the "similar" homes that my home is compared to in the *Home Energy Reports* are not actually like mine.	0	1	2	3	4	5	6	7	8	9	10
I like receiving the *Home Energy Reports*.	0	1	2	3	4	5	6	7	8	9	10
Since reading the *Home Energy Reports*, I have taken actions to use less energy than I would not have otherwise taken.	0	1	2	3	4	5	6	7	8	9	10

Q5. How could Duke Energy make *My Home Energy Reports* more useful for your household? Please provide any suggestions you may have to improve the reports.

_____

_____

_____

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Q6. Please rate how useful each feature of the *Home Energy Report* is to you.
   Scale: 0 = Not at all Useful; 10 = Extremely Useful

	Not at all Useful										Extremely Useful
Comparison to similar homes	0	1	2	3	4	5	6	7	8	9	10
Tips to help you save money and energy	0	1	2	3	4	5	6	7	8	9	10
Examples of the energy use associated with common household items	0	1	2	3	4	5	6	7	8	9	10
Customized suggestions for your home	0	1	2	3	4	5	6	7	8	9	10
Graphs that display your home's energy use over time	0	1	2	3	4	5	6	7	8	9	10
Information about services and offers from Duke Energy	0	1	2	3	4	5	6	7	8	9	10

Q7. Overall, how satisfied are you with the information in the *My Home Energy Reports* you've received?
   Scale: 0 = Not at all Satisfied; 10 = Completely Satisfied

Not at all Satisfied										Completely Satisfied
0	1	2	3	4	5	6	7	8	9	10

Q7a. Why do you say that? _____

Q8. Are you aware that you can go online to *My Home Energy Interactive* to access more information, above and beyond that found in the *My Home Energy Report*, which describes more ways to save energy?

   ☐ Yes   ☐ No – **Skip to Q9**

Q8a. Have you signed up to use *My Home Energy Interactive*?

   ☐ Yes   ☐ No – **Skip to Q8c**

Q8b. How useful is *My Home Energy Interactive* to you for saving energy?
   Scale: 0 = Not at all Useful; 10 = Extremely Useful

Not at all Useful										Extremely Useful
0	1	2	3	4	5	6	7	8	9	10

Q8c. Why haven't you signed up to use *My Home Energy Interactive*?

_____

_____

_____

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Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

☐ Yes   ☐ No – **Skip to Q13**

Q10. Which actions have been taken?

	Yes	No	Don't Know
Adjusted heating or cooling settings to save energy	☐	☐	☐
Reduced water heater temperature to save energy	☐	☐	☐
Wash clothes in cold water	☐	☐	☐
Fully load clothes washer	☐	☐	☐
Fully load dishwasher	☐	☐	☐
Turn off lights in unused or outdoor areas	☐	☐	☐
Unplug or shut down household electronics when not in use	☐	☐	☐
Maintain heating or cooling equipment for more efficient operation	☐	☐	☐
Use a portable fan or ceiling fan for cooling instead of an air conditioner	☐	☐	☐
Other, please specify:			
Other, please specify:			

Q11. Which energy efficiency improvements have been made?

	Yes	No	Don't Know
Install energy-efficient kitchen or laundry appliances	☐	☐	☐
Install energy-efficient heating/cooling system	☐	☐	☐
Install energy-efficient water heater	☐	☐	☐
Replace windows or doors with more energy-efficient types	☐	☐	☐
Caulk or weatherstrip (windows or doors)	☐	☐	☐
Add insulation to attic, walls, or floors	☐	☐	☐
Install energy-efficient lighting	☐	☐	☐
Install programmable thermostat or "smart" thermostat	☐	☐	☐
Purchase ENERGY STAR-certified home electronic equipment (a television, for example)	☐	☐	☐

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Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?   Scale: 0 = Not at all Important; 10 = Extremely Important

	Not at all Important										Extremely Important
Initial cost of energy efficient equipment is too high	0	1	2	3	4	5	6	7	8	9	10
Not enough time to shop/research/install /Too busy	0	1	2	3	4	5	6	7	8	9	10
I do not have the expertise	0	1	2	3	4	5	6	7	8	9	10
I do not have enough information to make a decision or understand the impacts of these improvements or behaviors	0	1	2	3	4	5	6	7	8	9	10
Getting everyone in the house to cooperate is too hard	0	1	2	3	4	5	6	7	8	9	10
I do not think my energy saving efforts are worth the time and/or money	0	1	2	3	4	5	6	7	8	9	10

Q13. Do you own or rent this residence?   ☐   Own   ☐   Rent

Q14. Including yourself, how many people live in your home? _____

Q15. In what year was your home built? _____

Q16. How many square feet is the above-ground living space? _____

Q17. What is your primary heating fuel?   ☐ Electricity   ☐ Natural Gas   ☐ Oil   ☐ Other

Q18. In what year were you born? _____

Thank you! Please return your completed survey using the enclosed envelope.

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Appendix D   Survey Frequencies: DEC

PRI_Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	2	1	0	1	2	11	6	24	37	40	86	1	211
Percent	1	0	0	0	1	5	3	11	18	19	41	0	100
Treatment	2	0	1	1	1	14	7	23	35	35	65	0	184
Percent	1	0	1	1	1	8	4	13	19	19	35	0	100
Total	4	1	1	2	3	25	13	47	72	75	151	1	395
Percent	1	0	0	1	1	6	3	12	18	19	38	0	100

PRI_Q2 Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.

PRI_Q2_1 The information available about Duke Energy's efficiency programs.

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	86	72	38	6	7	2	211
Percent	41	34	18	3	3	1	100
Treatment	82	60	28	5	8	1	184
Percent	45	33	15	3	4	1	100
Total	168	132	66	11	15	3	395
Percent	43	33	17	3	4	1	100

PRI_Q2_2 Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	93	66	35	8	7	2	211
Percent	44	31	17	4	3	1	100
Treatment	80	61	27	5	9	2	184
Percent	43	33	15	3	5	1	100
Total	173	127	62	13	16	4	395
Percent	44	32	16	3	4	1	100

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PRI_Q2_3 The information Duke Energy provides to help customers save on energy bills.

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	93	76	23	11	5	3	211
Percent	44	36	11	5	2	1	100
Treatment	90	59	18	7	8	2	184
Percent	49	32	10	4	4	1	100
Total	183	135	41	18	13	5	395
Percent	46.33	34	10	5	3	1	100

PRI_Q3 Have you logged in to your Duke Energy account to do any of the following? Check all that apply.

PRI_Q3_1   I have never logged in

Group	Not Checked	Checked	Total
Control	129	75	204
Percent	63	37	100
Treatment	115	65	180
Percent	64	36	100
Total	244	140	384
Percent	64	36	100

PRI_Q3_2   Pay my bill

Group	Not Checked	Checked	Total
Control	128	76	204
Percent	63	37	100
Treatment	116	64	180
Percent	64	36	100
Total	244	140	384
Percent	64	36	100

PRI_Q3_3   Review energy consumption graphs

Group	Not Checked	Checked	Total
Control	163	41	204
Percent	80	20	100
Treatment	146	34	180
Percent	81	19	100
Total	309	75	384
Percent	80	20	100

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PRI_Q3_4   Look for energy efficiency opportunities or ideas

Group	Not Checked	Checked	Total
Control	172	32	204
Percent	**84**	**16**	**100**
Treatment	151	29	180
Percent	**84**	**16**	**100**
Total	323	61	384
Percent	**84**	**16**	**100**

PRI_Q3_5   None of the above

Group	Not Checked	Checked	Total
Control	171	33	204
percent	**84**	**16**	**100**
Treatment	149	31	180
percent	**83**	**17**	**100**
Total	320	64	384
percent	**83**	**17**	**100**

PRI_ Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.

Group	Monthly	Once a year	A few times a year	Never	No Response	Total
Control	14	18	48	130	1	211
Percent	**7**	**9**	**23**	**62**	**0**	**100**
Treatment	14	13	34	123	0	184
Percent	**8**	**7**	**18**	**67**	**0**	**100**
Total	28	31	82	253	1	395
Percent	**7**	**8**	**21**	**64**	**0**	**100**

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PRI_Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	47	12	14	14	4	20	22	21	23	18	14	2	211
Percent	22	6	7	7	2	9	10	10	11	9	7	1	100
Treatment	46	10	9	10	7	27	8	13	20	12	22	0	184
Percent	25	5	5	5	4	15	4	7	11	7	12	0	100
Total	93	22	23	24	11	47	30	34	43	30	36	2	395
Percent	24	6	6	6	3	12	8	9	11	8	9	1	100

PRI_Q6. How important is it for you to know if your household is using energy wisely?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	2	1	3	3	11	19	26	40	34	70	1	211
Percent	0	1	0	1	1	5	9	12	19	16	33	0	100
Treatment	3	1	2	0	2	22	11	22	29	24	68	0	184
Percent	2	1	1	0	1	12	6	12	16	13	37	0	100
Total	4	3	3	3	5	33	30	48	69	58	138	1	395
Percent	1	1	1	1	1	8	8	12	17	15	35	0	100

PRI_Q7. How would you rate your knowledge of the different ways you can save energy in your home?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	2	0	8	6	6	31	19	43	48	26	21	1	211
Percent	1	0	4	3	3	15	9	20	23	12	10	0	100
Treatment	2	1	4	2	5	28	18	32	46	21	25	0	184
Percent	1	1	2	1	3	15	10	17	25	11	14	0	100
Total	4	1	12	8	11	59	37	75	94	47	46	1	395
Percent	1	0	3	2	3	15	9	19	24	12	12	0	100

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PRI_Q8 & TRE_Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

Group	Yes	No	No Response	Missing	Total
Control	129	77	5	0	211
Percent	**61**	**36**	**2**	**0**	**100**
Treatment	229	85	6	17	337
Percent	**68**	**25**	**2**	**5**	**100**
Total	358	162	11	17	548
Percent	**65**	**30**	**2**	**3**	**100**

PRI_Q9 & TRE_Q10. Which actions have been taken?

PRI_Q9_1 & TRE_Q10_1. Adjusted heating or cooling settings to save energy

Group	Yes	No	Don't Know	No Response	Total
Control	115	7	2	5	129
Percent	**89**	**5**	**2**	**4**	**100**
Treatment	213	13	1	2	229
Percent	**93**	**6**	**0**	**1**	**100**
Total	328	20	3	7	358
Percent	**92**	**6**	**1**	**2**	**100**

PRI_Q9_2 & TRE_Q10_2. Reduced water heater temperature to save energy

Group	Yes	No	Don't Know	No Response	Total
Control	41	75	6	7	129
Percent	**32**	**58**	**5**	**5**	**100**
Treatment	84	130	8	7	229
Percent	**37**	**57**	**3**	**3**	**100**
Total	125	205	14	14	358
Percent	**35**	**57**	**4**	**4**	**100**

PRI_Q9_3 & TRE_Q10_3. Wash clothes in cold water

Group	Yes	No	Don't Know	No Response	Total
Control	85	38	1	5	129
Percent	**66**	**29**	**1**	**4**	**100**
Treatment	170	51	5	3	229
Percent	**74**	**22**	**2**	**1**	**100**
Total	255	89	6	8	358
Percent	**71**	**25**	**2**	**2**	**100**

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PRI_Q9_4 & TRE_Q10_4. Fully load clothes washer

Group	Yes	No	Don't Know	No Response	Total
Control	98	23	3	5	129
Percent	**76**	**18**	**2**	**4**	**100**
Treatment	192	29	5	3	229
Percent	**84**	**13**	**2**	**1**	**100**
Total	290	52	8	8	358
Percent	**81**	**15**	**2**	**2**	**100**

PRI_Q9_5 & TRE_Q10_5. Fully load dishwasher

Group	Yes	No	Don't Know	No Response	Total
Control	81	27	12	9	129
Percent	**63**	**21**	**9**	**7**	**100**
Treatment	168	43	12	6	229
Percent	**73**	**19**	**5**	**3**	**100**
Total	249	70	24	15	358
Percent	**70**	**20**	**7**	**4**	**100**

PRI_Q9_6 & TRE_Q10_6. Turn off lights in unused or outdoor areas

Group	Yes	No	No Response	Total
Control	121	7	1	129
Percent	**94**	**5**	**1**	**100**
Treatment	224	4	1	229
Percent	**98**	**2**	**0**	**100**
Total	345	11	2	358
Percent	**96**	**3**	**1**	**100**

PRI_Q9_7 & TRE_Q10_7. Unplug or shut down household electronics when not in use

Group	Yes	No	No Response	Total
Control	100	25	4	129
Percent	**78**	**19**	**3**	**100**
Treatment	170	55	4	229
Percent	**74**	**24**	**2**	**100**
Total	270	80	8	358
Percent	**75**	**22**	**2**	**100**

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PRI_Q9_8 & TRE_Q10_8. Maintain heating or cooling equipment for more efficient operation

Group	Yes	No	Don't Know	No Response	Total
Control	104	11	5	9	129
Percent	**81**	**9**	**4**	**7**	**100**
Treatment	200	26	2	1	229
Percent	**87**	**11**	**1**	**0**	**100**
Total	304	37	7	10	358
Percent	**85**	**10**	**2**	**3**	**100**

PRI_Q9_9 & TRE_Q10_9. Use a portable fan or ceiling fan for cooling instead of an air conditioner

Group	Yes	No	Don't Know	No Response	Total
Control	88	35	3	3	129
Percent	**68**	**27**	**2**	**2**	**100**
Treatment	133	90	5	1	229
Percent	**58**	**39**	**2**	**0**	**100**
Total	221	125	8	4	358
Percent	**62**	**35**	**2**	**1**	**100**

PRI_Q9_10 & TRE_Q10_10. Other, please specify:

Group	Yes	No	Don't Know	No Response	Total
Control	32	30	41	26	129
Percent	**25**	**23**	**32**	**20**	**100**
Treatment	42	44	98	45	229
Percent	**18**	**19**	**43**	**20**	**100**
Total	74	74	139	71	358
Percent	**21**	**21**	**39**	**20**	**100**

PRI_Q9_11 & TRE_Q10_11. Other, please specify:

Group	Yes	No	Don't Know	No Response	Total
Control	8	48	44	29	129
Percent	**6**	**37**	**34**	**22**	**100**
Treatment	15	59	107	48	229
Percent	**7**	**26**	**47**	**21**	**100**
Total	23	107	151	77	358
Percent	**6**	**30**	**42**	**22**	**100**

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PRI_Q10 & TRE_Q11. Which energy efficiency improvements have been made?

PRI_Q10_1 & TRE_Q11_1. Install energy-efficient kitchen or laundry appliances

Group	Yes	No	Don't Know	No Response	Total
Control	66	53	6	4	129
Percent	**51**	**41**	**5**	**3**	**100**
Treatment	120	101	6	2	229
Percent	**52**	**44**	**3**	**1**	**100**
Total	186	154	12	6	358
Percent	**52**	**43**	**3**	**2**	**100**

PRI_Q10_2 & TRE_Q11_2. Install energy-efficient heating/cooling equipment

Group	Yes	No	Don't Know	No Response	Total
Control	65	54	5	5	129
Percent	**50**	**42**	**4**	**4**	**100**
Treatment	104	113	10	2	229
Percent	**45**	**49**	**4**	**1**	**100**
Total	169	167	15	7	358
Percent	**47**	**47**	**4**	**2**	**100**

PRI_Q10_3 & TRE_Q11_3. Install energy-efficient water heater

Group	Yes	No	Don't Know	No Response	Total
Control	51	67	6	5	129
Percent	**40**	**52**	**5**	**4**	**100**
Treatment	88	128	10	3	229
Percent	**38**	**56**	**4**	**1**	**100**
Total	139	195	16	8	358
Percent	**39**	**54**	**4**	**2**	**100**

PRI_Q10_4 & TRE_Q11_4. Replace windows or doors with more energy-efficient types)

Group	Yes	No	Don't Know	No Response	Total
Control	39	83	1	6	129
Percent	**30**	**64**	**1**	**5**	**100**
Treatment	79	144	3	3	229
Percent	**35**	**63**	**1**	**1**	**100**
Total	118	227	4	9	358
Percent	**33**	**63**	**1**	**3**	**100**

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PRI_Q10_5 & TRE_Q11_5. Caulk or weatherstrip (windows or doors)

Group	Yes	No	Don't Know	No Response	Total
Control	57	60	6	6	129
Percent	**44**	**47**	**5**	**5**	**100**
Treatment	111	111	3	4	229
Percent	**48**	**48**	**1**	**2**	**100**
Total	168	171	9	10	358
Percent	**47**	**48**	**3**	**3**	**100**

PRI_Q10_6 & TRE_Q11_6. Add insulation to attic, walls, or floors

Group	Yes	No	Don't Know	No Response	Total
Control	45	75	3	6	129
Percent	**35**	**58**	**2**	**5**	**100**
Treatment	69	147	4	9	229
Percent	**30**	**64**	**2**	**4**	**100**
Total	114	222	7	15	358
Percent	**32**	**62**	**2**	**4**	**100**

PRI_Q10_7 & TRE_Q11_7. Install energy-efficient lighting

Group	Yes	No	Don't Know	No Response	Total
Control	103	18	3	5	129
Percent	**80**	**14**	**2**	**4**	**100**
Treatment	186	40	2	1	229
Percent	**81**	**17**	**1**	**0**	**100**
Total	289	58	5	6	358
Percent	**81**	**16**	**1**	**2**	**100**

PRI_Q10_8 & TRE_Q11_8. Install programmable thermostat or "smart" thermostat

Group	Yes	No	Don't Know	No Response	Total
Control	64	56	4	5	129
Percent	**50**	**43**	**3**	**4**	**100**
Treatment	103	119	4	3	229
Percent	**45**	**52**	**2**	**1**	**100**
Total	167	175	8	8	358
Percent	**47**	**49**	**2**	**2**	**100**

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PRI_Q10_9 & TRE_Q11_9. Purchase ENERGY STAR certified home electronic equipment (a television, for example)

Group	Yes	No	Don't Know	No Response	Total
Control	73	37	12	7	129
Percent	**57**	**29**	**9**	**5**	**100**
Treatment	128	85	13	3	229
Percent	**56**	**37**	**6**	**1**	**100**
Total	201	122	25	10	358
Percent	**56**	**34**	**7**	**3**	**100**

PRI_Q11 & TRE_Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?

PRI_Q11_1 & TRE_Q12_1. Initial cost of energy efficient equipment is too high

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	10	2	3	5	7	19	7	18	15	14	25	4	129
Percent	**8**	**2**	**2**	**4**	**5**	**15**	**5**	**14**	**12**	**11**	**19**	**3**	**100**
Treatment	14	8	8	7	8	39	8	21	33	16	65	2	229
Percent	**6**	**3**	**3**	**3**	**3**	**17**	**3**	**9**	**14**	**7**	**28**	**1**	**100**
Total	24	10	11	12	15	58	15	39	48	30	90	6	358
Percent	**7**	**3**	**3**	**3**	**4**	**16**	**4**	**11**	**13**	**8**	**25**	**2**	**100**

PRI_Q11_2 & TRE_Q12_2. Not enough time to shop/research/install/too busy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	20	3	7	7	3	23	9	15	10	9	16	7	129
Percent	**16**	**2**	**5**	**5**	**2**	**18**	**7**	**12**	**8**	**7**	**12**	**5**	**100**
Treatment	39	12	11	10	8	57	6	17	26	10	28	5	229
Percent	**17**	**5**	**5**	**4**	**3**	**25**	**3**	**7**	**11**	**4**	**12**	**2**	**100**
Total	59	15	18	17	11	80	15	32	36	19	44	12	358
Percent	**16**	**4**	**5**	**5**	**3**	**22**	**4**	**9**	**10**	**5**	**12**	**3**	**100**

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PRI_Q11_3 & TRE_Q12_3. I do not have the expertise

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	22	4	6	6	7	28	9	11	9	8	14	5	129
Percent	**17**	**3**	**5**	**5**	**5**	**22**	**7**	**9**	**7**	**6**	**11**	**4**	**100**
Treatment	41	12	8	12	9	57	13	21	14	11	28	3	229
Percent	**18**	**5**	**3**	**5**	**4**	**25**	**6**	**9**	**6**	**5**	**12**	**1**	**100**
Total	63	16	14	18	16	85	22	32	23	19	42	8	358
Percent	**18**	**4**	**4**	**5**	**4**	**24**	**6**	**9**	**6**	**5**	**12**	**2**	**100**

PRI_Q11_4 & TRE_Q12_4. I do not have enough information to make a decision or understand the impacts of these improvements or behaviors

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	23	4	6	6	7	23	9	19	12	6	9	5	129
Percent	**18**	**3**	**5**	**5**	**5**	**18**	**7**	**15**	**9**	**5**	**7**	**4**	**100**
Treatment	40	6	14	9	9	48	20	16	22	5	35	5	229
Percent	**17**	**3**	**6**	**4**	**4**	**21**	**9**	**7**	**10**	**2**	**15**	**2**	**100**
Total	63	10	20	15	16	71	29	35	34	11	44	10	358
Percent	**18**	**3**	**6**	**4**	**4**	**20**	**8**	**10**	**10**	**3**	**12**	**3**	**100**

PRI_Q11_5 & TRE_Q12_5. Getting everyone in the house to cooperate is too hard

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	26	6	3	7	6	22	8	6	7	5	25	8	129
Percent	**20**	**5**	**2**	**5**	**5**	**17**	**6**	**5**	**5**	**4**	**19**	**6**	**100**
Treatment	60	12	9	5	7	37	10	14	22	10	38	5	229
Percent	**26**	**5**	**4**	**2**	**3**	**16**	**4**	**6**	**10**	**4**	**17**	**2**	**100**
Total	86	18	12	12	13	59	18	20	29	15	63	13	358
Percent	**24**	**5**	**3**	**3**	**4**	**16**	**5**	**6**	**8**	**4**	**18**	**4**	**100**

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PRI_Q11_6 & TRE_Q12_6. I do not think my energy saving efforts are worth the time and/or money

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	23	9	5	5	8	20	6	4	12	8	23	6	129
Percent	18	7	4	4	6	16	5	3	9	6	18	5	100
Treatment	38	16	12	10	3	37	9	13	23	13	51	4	229
Percent	17	7	5	4	1	16	4	6	10	6	22	2	100
Total	61	25	17	15	11	57	15	17	35	21	74	10	358
Percent	17	7	5	4	3	16	4	5	10	6	21	3	100

PRI_Q12 Which of the following do you do with regard to your household's energy use? Check all that apply.

PRI_Q12_1 Track monthly energy use

Group	Not Checked	Checked	Total
Control	116	91	207
Percent	56	44	100
Treatment	100	83	183
Percent	55	45	100
Total	216	174	390
Percent	55	45	100

PRI_Q12_2   Track the total amount of your bill

Group	Not Checked	Checked	Total
Control	64	143	207
Percent	31	69	100
Treatment	78	105	183
Percent	43	57	100
Total	142	248	390
Percent	36	64	100

PRI_Q12_3   Compare usage to previous months

Group	Not Checked	Checked	Total
Control	66	141	207
Percent	32	68	100
Treatment	62	121	183
Percent	34	66	100
Total	128	262	390
Percent	33	67	100

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PRI_Q12_4 Compare usage to the same month from last year

Group	Not Checked	Checked	Total
Control	87	120	207
Percent	**42**	**58**	**100**
Treatment	83	100	183
Percent	**45**	**55**	**100**
Total	170	220	390
Percent	**44**	**56**	**100**

PRI_Q12_5 None of the above

Group	Not Checked	Checked	Total
Control	189	18	207
Percent	**91**	**9**	**100**
Treatment	153	30	183
Percent	**84**	**16**	**100**
Total	342	48	390
Percent	**88**	**12**	**100**

PRI_Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household.

PRI_Q13_1. Your home's energy use compared to that of similar homes

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	17	5	5	11	4	34	10	27	22	21	46	9	211
Percent	**8**	**2**	**2**	**5**	**2**	**16**	**5**	**13**	**10**	**10**	**22**	**4**	**100**
Treatment	18	5	7	3	7	24	8	26	25	11	47	3	184
Percent	**10**	**3**	**4**	**2**	**4**	**13**	**4**	**14**	**14**	**6**	**26**	**2**	**100**
Total	35	10	12	14	11	58	18	53	47	32	93	12	395
Percent	**9**	**3**	**3**	**4**	**3**	**15**	**5**	**13**	**12**	**8**	**24**	**3**	**100**

PRI_Q13_2. Tips to help you save money and energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	5	2	2	3	7	32	16	24	26	24	64	6	211
Percent	**2**	**1**	**1**	**1**	**3**	**15**	**8**	**11**	**12**	**11**	**30**	**3**	**100**
Treatment	10	3	3	4	2	24	5	28	29	17	58	1	184
Percent	**5**	**2**	**2**	**2**	**1**	**13**	**3**	**15**	**16**	**9**	**32**	**1**	**100**
Total	15	5	5	7	9	56	21	52	55	41	122	7	395
Percent	**4**	**1**	**1**	**2**	**2**	**14**	**5**	**13**	**14**	**10**	**31**	**2**	**100**

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PRI_Q13_3. Examples of the energy use associated with common household items

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	6	2	5	2	9	31	12	27	25	21	63	8	211
Percent	3	1	2	1	4	15	6	13	12	10	30	4	100
Treatment	16	3	3	2	3	24	11	27	28	20	45	2	184
Percent	9	2	2	1	2	13	6	15	15	11	24	1	100
Total	22	5	8	4	12	55	23	54	53	41	108	10	395
Percent	6	1	2	1	3	14	6	14	13	10	27	3	100

PRI_Q13_4. Customized suggestions for your home

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	13	1	10	7	9	35	14	22	16	19	54	11	211
Percent	6	0	5	3	4	17	7	10	8	9	26	5	100
Treatment	15	5	4	7	2	23	11	23	28	19	43	4	184
Percent	8	3	2	4	1	13	6	13	15	10	23	2	100
Total	28	6	14	14	11	58	25	45	44	38	97	15	395
Percent	7	2	4	4	3	15	6	11	11	10	25	4	100

PRI_Q13_5. Graphs that display your home's energy use over time

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	11	2	7	3	2	25	10	26	30	19	69	7	211
Percent	5	1	3	1	1	12	5	12	14	9	33	3	100
Treatment	13	5	3	5	4	25	7	26	24	20	49	3	184
Percent	7	3	2	3	2	14	4	14	13	11	27	2	100
Total	24	7	10	8	6	50	17	52	54	39	118	10	395
Percent	6	2	3	2	2	13	4	13	14	10	30	3	100

PRI_Q13_6. Information about services and offers from Duke Energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	9	1	4	4	5	30	14	20	28	24	66	6	211
Percent	4	0	2	2	2	14	7	9	13	11	31	3	100
Treatment	11	2	5	4	5	27	9	29	20	13	56	3	184
Percent	6	1	3	2	3	15	5	16	11	7	30	2	100
Total	20	3	9	8	10	57	23	49	48	37	122	9	395
Percent	5	1	2	2	3	14	6	12	12	9	31	2	100

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PRI_Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you.

PRI_Q14_1. Reducing my energy bill(s)

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	1	0	1	11	8	15	29	20	121	4	211
Percent	**0**	**0**	**0**	**0**	**0**	**5**	**4**	**7**	**14**	**9**	**57**	**2**	**100**
Treatment	3	0	1	1	1	8	5	16	21	27	100	1	184
Percent	**2**	**0**	**1**	**1**	**1**	**4**	**3**	**9**	**11**	**15**	**54**	**1**	**100**
Total	4	0	2	1	2	19	13	31	50	47	221	5	395
Percent	**1**	**0**	**1**	**0**	**1**	**5**	**3**	**8**	**13**	**12**	**56**	**1**	**100**

PRI_Q14_2. Helping the environment

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	2	0	3	4	4	18	10	22	34	18	92	4	211
Percent	**1**	**0**	**1**	**2**	**2**	**9**	**5**	**10**	**16**	**9**	**44**	**2**	**100**
Treatment	4	2	2	4	5	14	6	21	20	24	79	3	184
Percent	**2**	**1**	**1**	**2**	**3**	**8**	**3**	**11**	**11**	**13**	**43**	**2**	**100**
Total	6	2	5	8	9	32	16	43	54	42	171	7	395
Percent	**2**	**1**	**1**	**2**	**2**	**8**	**4**	**11**	**14**	**11**	**43**	**2**	**100**

PRI_Q14_3. Setting an example for others

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	14	5	8	6	5	33	16	20	23	10	64	7	211
Percent	**7**	**2**	**4**	**3**	**2**	**16**	**8**	**9**	**11**	**5**	**30**	**3**	**100**
Treatment	21	6	1	5	9	26	11	24	21	16	41	3	184
Percent	**11**	**3**	**1**	**3**	**5**	**14**	**6**	**13**	**11**	**9**	**22**	**2**	**100**
Total	35	11	9	11	14	59	27	44	44	26	105	10	395
Percent	**9**	**3**	**2**	**3**	**4**	**15**	**7**	**11**	**11**	**7**	**27**	**3**	**100**

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PRI_Q14_4. Avoiding waste

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	3	2	2	13	6	22	40	24	94	4	211
Percent	**0**	**0**	**1**	**1**	**1**	**6**	**3**	**10**	**19**	**11**	**45**	**2**	**100**
Treatment	2	1	0	2	4	8	7	15	30	29	85	1	184
Percent	**1**	**1**	**0**	**1**	**2**	**4**	**4**	**8**	**16**	**16**	**46**	**1**	**100**
Total	3	1	3	4	6	21	13	37	70	53	179	5	395
Percent	**1**	**0**	**1**	**1**	**2**	**5**	**3**	**9**	**18**	**13**	**45**	**1**	**100**

PRI_Q14_5. Conserving energy resources

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	2	4	1	17	11	22	33	23	93	4	211
Percent	**0**	**0**	**1**	**2**	**0**	**8**	**5**	**10**	**16**	**11**	**44**	**2**	**100**
Treatment	3	1	0	2	1	13	5	24	25	33	75	2	184
Percent	**2**	**1**	**0**	**1**	**1**	**7**	**3**	**13**	**14**	**18**	**41**	**1**	**100**
Total	4	1	2	6	2	30	16	46	58	56	168	6	395
Percent	**1**	**0**	**1**	**2**	**1**	**8**	**4**	**12**	**15**	**14**	**43**	**2**	**100**

PRI_Q15. Please indicate your level of agreement with each of the following statements

PRI_Q15_1. Duke Energy provides excellent customer service

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	3	7	20	87	93	1	211
Percent	**1**	**3**	**9**	**41**	**44**	**0**	**100**
Treatment	1	4	26	72	79	2	184
Percent	**1**	**2**	**14**	**39**	**43**	**1**	**100**
Total	4	11	46	159	172	3	395
Percent	**1**	**3**	**12**	**40**	**44**	**1**	**100**

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PRI_Q15_2. Duke Energy respects its customers

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	5	14	23	76	90	3	211
Percent	2	7	11	36	43	1	100
Treatment	3	10	36	66	68	1	184
Percent	2	5	20	36	37	1	100
Total	8	24	59	142	158	4	395
Percent	2	6	15	36	40	1	100

PRI_Q15_3. Duke Energy provides service at a reasonable cost

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	7	23	30	100	48	3	211
Percent	3	11	14	47	23	1	100
Treatment	4	22	39	75	42	2	184
Percent	2	12	21	41	23	1	100
Total	11	45	69	175	90	5	395
Percent	3	11	17	44	23	1	100

PRI_Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?

Group	Yes	No	No Response	Total
Control	156	52	3	211
Percent	74	25	1	100
Treatment	118	63	3	184
Percent	64	34	2	100
Total	274	115	6	395
Percent	69	29	2	100

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PRI_Q16a. How many free light bulbs have you ordered through the Duke Energy website this year?

Group	0	1	2	3	4	5	6	8	10	12	14	15	16	20	24	30	50	N.R.	M.	T.
Control	92	8	3	1	1	1	3	4	2	15	1	4	0	1	1	1	1	3	14	156
Percent	59	5	2	1	1	1	2	3	1	10	1	3	0	1	1	1	1	2	9	100
Treatment	71	8	0	0	1	1	5	3	3	12	0	0	2	2	0	0	0	0	10	118
Percent	60	7	0	0	1	1	4	3	3	10	0	0	2	2	0	0	0	0	8	100
Total	163	16	3	1	2	2	8	7	5	27	1	4	2	3	1	1	1	3	24	274
Percent	59	6	1	0	1	1	3	3	2	10	0	1	1	1	0	0	0	1	9	100

PRI_Q16b. How many discounted light bulbs have you ordered through the Duke Energy website this year?

Group	0	1	2	4	5	6	8	12	15	16	20	24	30	No Response	Missing	Total
Control	128	1	0	1	0	0	1	5	1	0	2	2	1	1	13	156
Percent	82	1	0	1	0	0	1	3	1	0	1	1	1	1	8	100
Treatment	95	3	1	1	1	2	0	0	0	2	1	0	0	0	12	118
Percent	81	3	1	1	1	2	0	0	0	2	1	0	0	0	10	100
Total	223	4	1	2	1	2	1	5	1	2	3	2	1	1	25	274
Percent	81	1	0	1	0	1	0	2	0	1	1	1	0	0	9	100

PRI_Q18 & TRE_Q13. Do you own or rent this residence?

Group	Own	Rent	Missing	Total
Control	192	13	6	211
Percent	91	6	3	100
Treatment	306	24	7	337
Percent	91	7	2	100
Total	498	37	13	548
Percent	91	7	2	100

PRI_Q19 & TRE_Q14. Including yourself, how many people live in your home?

Group	1	2	3	4	5	6	7	9	10	No Response	Missing	Total
Control	43	95	27	26	11	1	1	0	1	0	6	211
Percent	20	45	13	12	5	0	0	0	0	0	3	100
Treatment	65	149	50	40	16	5	1	1	0	1	9	337
Percent	19	44	15	12	5	1	0	0	0	0	3	100
Total	108	244	77	66	27	6	2	1	1	1	15	548
Percent	20	45	14	12	5	1	0	0	0	0	3	100

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PRI_Q22 & TRE_Q17. What is your primary heating fuel?

Group	Electricity	Natural Gas	Oil	Other	Missing	Total
Control	94	88	5	16	8	211
Percent	**45**	**42**	**2**	**8**	**4**	**100**
Treatment	158	147	8	15	9	337
Percent	**47**	**44**	**2**	**4**	**3**	**100**
Total	252	235	13	31	17	548
Percent	**46**	**43**	**2**	**6**	**3**	**100**

TRE_Q1. Duke Energy sends a personalized report called My Home Energy Report to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?

Group	Yes	No	No Response	Total
Treatment	142	10	1	153
Percent	**93**	**7**	**1**	**100**

TRE_Q2. About how many My Home Energy Reports have you received in the past 12 months?

Group	0	1	2	3	4	5	6	7	8	9	10	11	12	24	No Response	Missing	Total
Treatment	3	2	9	12	27	3	20	1	5	3	7	2	42	1	5	1	143
Percent	**2**	**1**	**6**	**8**	**19**	**2**	**14**	**1**	**4**	**2**	**5**	**1**	**29**	**1**	**4**	**1**	**100**

TRE_Q3. How often do you read the My Home Energy Reports?

Group	Always	Sometimes	Never	No Response	Missing	Total
Treatment	100	35	2	1	2	140
Percent	**71**	**25**	**1**	**1**	**1**	**100**

TRE_Q4. How much do you agree or disagree with the following statements about My Home Energy Reports?

TRE_Q4_1. I have learned about my household's energy use from My Home Energy Reports.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	2	2	0	6	7	13	9	17	11	20	48	1	2	138
Percent	**1**	**1**	**0**	**4**	**5**	**9**	**7**	**12**	**8**	**14**	**35**	**1**	**1**	**100**

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TRE_Q4_2. I use the reports to tell me how well I am doing at saving energy.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	2	3	6	5	20	6	18	18	12	39	1	2	138
Percent	4	1	2	4	4	14	4	13	13	9	28	1	1	100

TRE_Q4_3. The tips provided in the reports are pertinent to my home.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	5	6	5	7	19	21	9	18	13	27	2	2	138
Percent	3	4	4	4	5	14	15	7	13	9	20	1	1	100

TRE_Q4_4. My Home Energy Reports provide the details I need to understand my home's energy use.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	2	2	5	9	17	14	16	13	15	36	1	2	138
Percent	4	1	1	4	7	12	10	12	9	11	26	1	1	100

TRE_Q4_5. I have discussed My Home Energy Reports with others.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	36	17	6	4	7	16	7	8	10	2	22	1	2	138
Percent	26	12	4	3	5	12	5	6	7	1	16	1	1	100

TRE_Q4_6. The information provided about my home's energy use is confusing.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	51	24	10	12	6	14	2	5	5	3	3	1	2	138
Percent	37	17	7	9	4	10	1	4	4	2	2	1	1	100

TRE_Q4_7. I suspect that the "similar" homes that my home is compared to in the Home Energy Reports are not actually like mine.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	13	11	4	6	4	29	10	14	12	9	23	1	2	138
Percent	9	8	3	4	3	21	7	10	9	7	17	1	1	100

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TRE_Q4_8. Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	11	5	5	4	12	28	10	17	13	9	21	1	2	138
Percent	8	4	4	3	9	20	7	12	9	7	15	1	1	100

TRE_Q6. Please rate how useful each feature of the Home Energy Report is to you.

TRE_Q6_1. Comparison to similar homes

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	15	9	7	8	5	9	11	18	23	9	21	1	2	138
Percent	11	7	5	6	4	7	8	13	17	7	15	1	1	100

TRE_Q6_2. Tips to help you save money and energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	0	2	2	7	20	10	21	24	9	35	1	2	138
Percent	4	0	1	1	5	14	7	15	17	7	25	1	1	100

TRE_Q6_3. Examples of the energy use associated with common household items

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	1	2	7	5	19	9	18	21	13	34	1	2	138
Percent	4	1	1	5	4	14	7	13	15	9	25	1	1	100

TRE_Q6_4. Customized suggestions for your home

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	9	2	2	6	8	19	9	22	18	10	29	2	2	138
Percent	7	1	1	4	6	14	7	16	13	7	21	1	1	100

TRE_Q6_5. Graphs that display your home's energy use over time

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	2	3	1	2	10	9	13	20	19	51	1	2	138
Percent	4	1	2	1	1	7	7	9	14	14	37	1	1	100

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TRE_Q6_6. Information about services and offers from Duke Energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	4	1	3	7	28	9	21	17	9	31	2	2	138
Percent	3	3	1	2	5	20	7	15	12	7	22	1	1	100

TRE_Q7. Overall, how satisfied are you with the information in the My Home Energy Reports you've received?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	1	5	2	3	0	8	20	21	15	40	16	2	138
Percent	4	1	4	1	2	0	6	14	15	11	29	12	1	100

TRE_Q8. Are you aware that you can go online to My Home Energy Interactive to access more information, above and beyond that found in the My Home Energy Report, which describes more ways to save energy?

Group	Yes	No	No Response	Missing	Total
Treatment	38	97	1	2	138
Percent	28	70	1	1	100

TRE_Q8a. Have you signed up to use My Home Energy Interactive?

Group	Yes	No	Missing	Total
Treatment	3	35	3	41
Percent	7	85	7	100

TRE_Q8b. How useful is My Home Energy Interactive to you for saving energy?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	0	0	0	0	0	1	0	0	0	0	2	0	3	6
Percent	0	0	0	0	0	17	0	0	0	0	33	0	50	100

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Appendix E   Survey Frequencies: DEP

PRI_Q1. Please rate how satisfied you are with Duke Energy as your electric supplier.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	1	0	0	4	2	10	10	22	37	35	69	2	192
Percent	**1**	**0**	**0**	**2**	**1**	**5**	**5**	**11**	**19**	**18**	**36**	**1**	**100**
Treatment	0	1	0	2	0	10	11	18	38	23	69	4	176
Percent	**0**	**1**	**0**	**1**	**0**	**6**	**6**	**10**	**22**	**13**	**39**	**2**	**100**
Total	1	1	0	6	2	20	21	40	75	58	138	6	368
Percent	**0**	**0**	**0**	**2**	**1**	**5**	**6**	**11**	**20**	**16**	**38**	**2**	**100**

PRI_Q2 Please rate your overall satisfaction with each of the following aspects of communications from Duke Energy.

PRI_Q2_1 The information available about Duke Energy's efficiency programs.

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	No Response	Total
Control	71	65	44	5	6	1	192
Percent	**37**	**34**	**23**	**3**	**3**	**1**	**100**
Treatment	83	60	22	7	4	0	176
Percent	**47**	**34**	**13**	**4**	**2**	**0**	**100**
Total	154	125	66	12	10	1	368
Percent	**42**	**34**	**18**	**3**	**3**	**0**	**100**

PRI_Q2_2 Duke Energy's commitment to promoting energy efficiency and the wise use of electricity.

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	Total
Control	70	68	40	8	6	192
Percent	**36**	**35**	**21**	**4**	**3**	**100**
Treatment	83	61	18	9	5	176
Percent	**47**	**35**	**10**	**5**	**3**	**100**
Total	153	129	58	17	11	368
Percent	**42**	**35**	**16**	**5**	**3**	**100**

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PRI_Q2_3 The information Duke Energy provides to help customers save on energy bills.

Group	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	Total
Control	70	70	37	10	5	192
Percent	**36**	**36**	**19**	**5**	**3**	**100**
Treatment	83	61	16	12	4	176
Percent	**47**	**35**	**9**	**7**	**2**	**100**
Total	153	131	53	22	9	368
Percent	**41.58**	**36**	**14**	**6**	**2**	**100**

PRI_Q3 Have you logged in to your Duke Energy account to do any of the following? Check all that apply.

PRI_Q3_1   I have never logged in

Group	Not Checked	Checked	Total
Control	114	71	185
Percent	**62**	**38**	**100**
Treatment	101	73	174
Percent	**58**	**42**	**100**
Total	215	144	359
Percent	**60**	**40**	**100**

PRI_Q3_2   Pay my bill

Group	Not Checked	Checked	Total
Control	114	71	185
Percent	**62**	**38**	**100**
Treatment	112	62	174
Percent	**64**	**36**	**100**
Total	226	133	359
Percent	**63**	**37**	**100**

PRI_Q3_3   Review energy consumption graphs

Group	Not Checked	Checked	Total
Control	145	40	185
Percent	**78**	**22**	**100**
Treatment	141	33	174
Percent	**81**	**19**	**100**
Total	286	73	359
Percent	**80**	**20**	**100**

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PRI_Q3_4   Look for energy efficiency opportunities or ideas

Group	Not Checked	Checked	Total
Control	170	15	185
Percent	**92**	**8**	**100**
Treatment	156	18	174
Percent	**90**	**10**	**100**
Total	326	33	359
Percent	**91**	**9**	**100**

PRI_Q3_5   None of the above

Group	Not Checked	Checked	Total
Control	154	31	185
percent	**83**	**17**	**100**
Treatment	142	32	174
percent	**82**	**18**	**100**
Total	296	63	359
percent	**82**	**18**	**100**

PRI_ Q4. How often do you access the Duke Energy website to search for information about rebate programs, energy efficient products, or ways to make your home more energy efficient? Select only one.

Group	Monthly	One a year	A few times a year	Never	No Response	Total
Control	17	20	25	129	1	192
Percent	**9**	**10**	**13**	**67**	**1**	**100**
Treatment	13	16	25	122	0	176
Percent	**7**	**9**	**14**	**69**	**0**	**100**
Total	30	36	50	251	1	368
Percent	**8**	**10**	**14**	**68**	**0**	**100**

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PRI_Q5. If you needed to replace major home equipment or were considering improvements to your home's energy performance today, how likely would you be to check the Duke Energy website for information about energy efficient solutions or incentives?

Group	0	1	2	3	4	5	6	7	8	9	10	Total
Control	53	9	5	9	1	29	12	13	21	8	32	192
Percent	28	5	3	5	1	15	6	7	11	4	17	100
Treatment	39	6	8	11	6	28	6	18	16	19	19	176
Percent	22	3	5	6	3	16	3	10	9	11	11	100
Total	92	15	13	20	7	57	18	31	37	27	51	368
Percent	25	4	4	5	2	15	5	8	10	7	14	100

PRI_Q6. How important is it for you to know if your household is using energy wisely?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	3	0	2	3	0	15	11	15	32	30	79	2	192
Percent	2	0	1	2	0	8	6	8	17	16	41	1	100
Treatment	3	0	2	3	0	14	9	19	26	29	71	0	176
Percent	2	0	1	2	0	8	5	11	15	16	40	0	100
Total	6	0	4	6	0	29	20	34	58	59	150	2	368
Percent	2	0	1	2	0	8	5	9	16	16	41	1	100

PRI_Q7. How would you rate your knowledge of the different ways you can save energy in your home?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	5	1	5	5	5	29	23	35	31	30	22	1	192
Percent	3	1	3	3	3	15	12	18	16	16	11	1	100
Treatment	2	3	0	4	2	29	17	29	42	27	21	0	176
Percent	1	2	0	2	1	16	10	16	24	15	12	0	100
Total	7	4	5	9	7	58	40	64	73	57	43	1	368
Percent	2	1	1	2	2	16	11	17	20	15	12	0	100

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PRI_Q8 & TRE_Q9. Over the past 12 months, have you or another member of your household taken any actions to reduce your household energy use, or made any energy efficiency improvements in your home?

Group	Yes	No	No Response	Missing	Total
Control	114	76	2	0	192
Percent	**59**	**40**	**1**	**0**	**100**
Treatment	225	90	10	22	347
Percent	**65**	**26**	**3**	**6**	**100**
Total	339	166	12	22	539
Percent	**63**	**31**	**2**	**4**	**100**

PRI_Q9 & TRE_Q10. Which actions have been taken?

PRI_Q9_1 & TRE_Q10_1. Adjusted heating or cooling settings to save energy

Group	Yes	No	Don't know	No Response	Total
Control	109	3	0	2	114
Percent	**96**	**3**	**0**	**2**	**100**
Treatment	210	9	2	4	225
Percent	**93**	**4**	**1**	**2**	**100**
Total	319	12	2	6	339
Percent	**94**	**4**	**1**	**2**	**100**

PRI_Q9_2 & TRE_Q10_2. Reduced water heater temperature to save energy

Group	Yes	No	Don't know	No Response	Total
Control	42	62	3	7	114
Percent	**37**	**54**	**3**	**6**	**100**
Treatment	85	127	8	5	225
Percent	**38**	**56**	**4**	**2**	**100**
Total	127	189	11	12	339
Percent	**37**	**56**	**3**	**4**	**100**

PRI_Q9_3 & TRE_Q10_3. Wash clothes in cold water

Group	Yes	No	Don't know	No Response	Total
Control	76	32	2	4	114
Percent	**67**	**28**	**2**	**4**	**100**
Treatment	172	47	2	4	225
Percent	**76**	**21**	**1**	**2**	**100**
Total	248	79	4	8	339
Percent	**73**	**23**	**1**	**2**	**100**

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PRI_Q9_4 & TRE_Q10_4. Fully load clothes washer

Group	Yes	No	Don't know	No Response	Total
Control	97	11	2	4	114
Percent	85	10	2	4	100
Treatment	181	37	2	5	225
Percent	80	16	1	2	100
Total	278	48	4	9	339
Percent	82	14	1	3	100

PRI_Q9_5 & TRE_Q10_5. Fully load dishwasher

Group	Yes	No	Don't know	No Response	Total
Control	78	20	5	11	114
Percent	68	18	4	10	100
Treatment	164	34	16	11	225
Percent	73	15	7	5	100
Total	242	54	21	22	339
Percent	71	16	6	6	100

PRI_Q9_6 & TRE_Q10_6. Turn off lights in unused or outdoor areas

Group	Yes	No	No Response	Total
Control	111	0	3	114
Percent	97	0	3	100
Treatment	216	6	3	225
Percent	96	3	1	100
Total	327	6	6	339
Percent	96	2	2	100

PRI_Q9_7 & TRE_Q10_7. Unplug or shut down household electronics when not in use

Group	Yes	No	Don't know	No Response	Total
Control	82	29	1	2	114
Percent	72	25	1	2	100
Treatment	154	64	4	3	225
Percent	68	28	2	1	100
Total	236	93	5	5	339
Percent	70	27	1	1	100

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PRI_Q9_8 & TRE_Q10_8. Maintain heating or cooling equipment for more efficient operation

Group	Yes	No	Don't know	No Response	Total
Control	104	4	3	3	114
Percent	**91**	**4**	**3**	**3**	**100**
Treatment	190	27	6	2	225
Percent	**84**	**12**	**3**	**1**	**100**
Total	294	31	9	5	339
Percent	**87**	**9**	**3**	**1**	**100**

PRI_Q9_9 & TRE_Q10_9. Use a portable fan or ceiling fan for cooling instead of an air conditioner

Group	Yes	No	Don't know	No Response	Total
Control	76	34	1	3	114
Percent	**67**	**30**	**1**	**3**	**100**
Treatment	159	57	5	4	225
Percent	**71**	**25**	**2**	**2**	**100**
Total	235	91	6	7	339
Percent	**69**	**27**	**2**	**2**	**100**

PRI_Q9_10 & TRE_Q10_10. Other, please specify:

Group	Yes	No	Don't know	No Response	Total
Control	29	24	34	27	114
Percent	**25**	**21**	**30**	**24**	**100**
Treatment	39	55	78	53	225
Percent	**17**	**24**	**35**	**24**	**100**
Total	68	79	112	80	339
Percent	**20**	**23**	**33**	**24**	**100**

PRI_Q9_11 & TRE_Q10_11. Other, please specify:

Group	Yes	No	Don't know	No Response	Total
Control	10	36	39	29	114
Percent	**9**	**32**	**34**	**25**	**100**
Treatment	15	71	82	57	225
Percent	**7**	**32**	**36**	**25**	**100**
Total	25	107	121	86	339
Percent	**7**	**32**	**36**	**25**	**100**

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PRI_Q10 & TRE_Q11. Which energy efficiency improvements have been made?

PRI_Q10_1 & TRE_Q11_1. Install energy-efficient kitchen or laundry appliances

Group	Yes	No	Don't know	No Response	Total
Control	56	53	3	2	114
Percent	**49**	**46**	**3**	**2**	**100**
Treatment	133	72	11	9	225
Percent	**59**	**32**	**5**	**4**	**100**
Total	189	125	14	11	339
Percent	**56**	**37**	**4**	**3**	**100**

PRI_Q10_2 & TRE_Q11_2. Install energy-efficient heating/cooling equipment

Group	Yes	No	Don't know	No Response	Total
Control	52	51	8	3	114
Percent	**46**	**45**	**7**	**3**	**100**
Treatment	112	95	14	4	225
Percent	**50**	**42**	**6**	**2**	**100**
Total	164	146	22	7	339
Percent	**48**	**43**	**6**	**2**	**100**

PRI_Q10_3 & TRE_Q11_3. Install energy-efficient water heater

Group	Yes	No	Don't know	No Response	Total
Control	50	52	9	3	114
Percent	**44**	**46**	**8**	**3**	**100**
Treatment	95	108	17	5	225
Percent	**42**	**48**	**8**	**2**	**100**
Total	145	160	26	8	339
Percent	**43**	**47**	**8**	**2**	**100**

PRI_Q10_4 & TRE_Q11_4. Replace windows or doors with more energy-efficient types)

Group	Yes	No	Don't know	No Response	Total
Control	41	67	3	3	114
Percent	**36**	**59**	**3**	**3**	**100**
Treatment	78	133	6	8	225
Percent	**35**	**59**	**3**	**4**	**100**
Total	119	200	9	11	339
Percent	**35**	**59**	**3**	**3**	**100**

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PRI_Q10_5 & TRE_Q11_5. Caulk or weatherstrip (windows or doors)

Group	Yes	No	Don't know	No Response	Total
Control	66	44	3	1	114
Percent	**58**	**39**	**3**	**1**	**100**
Treatment	115	96	6	8	225
Percent	**51**	**43**	**3**	**4**	**100**
Total	181	140	9	9	339
Percent	**53**	**41**	**3**	**3**	**100**

PRI_Q10_6 & TRE_Q11_6. Add insulation to attic, walls, or floors

Group	Yes	No	Don't know	No Response	Total
Control	36	68	5	5	114
Percent	**32**	**60**	**4**	**4**	**100**
Treatment	84	125	8	8	225
Percent	**37**	**56**	**4**	**4**	**100**
Total	120	193	13	13	339
Percent	**35**	**57**	**4**	**4**	**100**

PRI_Q10_7 & TRE_Q11_7. Install energy-efficient lighting

Group	Yes	No	Don't know	No Response	Total
Control	93	18	3	0	114
Percent	**82**	**16**	**3**	**0**	**100**
Treatment	173	43	5	4	225
Percent	**77**	**19**	**2**	**2**	**100**
Total	266	61	8	4	339
Percent	**78**	**18**	**2**	**1**	**100**

PRI_Q10_8 & TRE_Q11_8. Install programmable thermostat or "smart" thermostat

Group	Yes	No	Don't know	No Response	Total
Control	47	59	3	5	114
Percent	**41**	**52**	**3**	**4**	**100**
Treatment	108	102	8	7	225
Percent	**48**	**45**	**4**	**3**	**100**
Total	155	161	11	12	339
Percent	**46**	**47**	**3**	**4**	**100**

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PRI_Q10_9 & TRE_Q11_9. Purchase ENERGY STAR certified home electronic equipment (a television, for example)

Group	Yes	No	Don't know	No Response	Total
Control	63	39	10	2	114
Percent	**55**	**34**	**9**	**2**	**100**
Treatment	129	70	16	10	225
Percent	**57**	**31**	**7**	**4**	**100**
Total	192	109	26	12	339
Percent	**57**	**32**	**8**	**4**	**100**

PRI_Q11 & TRE_Q12. Below are some reasons why you might not be able to save as much energy as you would like. How important are each of the following reasons?

PRI_Q11_1 & TRE_Q12_1. Initial cost of energy efficient equipment is too high

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	8	4	3	4	6	19	11	11	9	12	23	4	114
Percent	**7**	**4**	**3**	**4**	**5**	**17**	**10**	**10**	**8**	**11**	**20**	**4**	**100**
Treatment	20	6	4	8	13	35	15	24	27	10	59	4	225
Percent	**9**	**3**	**2**	**4**	**6**	**16**	**7**	**11**	**12**	**4**	**26**	**2**	**100**
Total	28	10	7	12	19	54	26	35	36	22	82	8	339
Percent	**8**	**3**	**2**	**4**	**6**	**16**	**8**	**10**	**11**	**6**	**24**	**2**	**100**

PRI_Q11_2 & TRE_Q12_2. Not enough time to shop/research/install/too busy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	17	7	4	2	5	25	5	15	12	6	11	5	114
Percent	**15**	**6**	**4**	**2**	**4**	**22**	**4**	**13**	**11**	**5**	**10**	**4**	**100**
Treatment	42	8	9	13	16	49	13	18	17	7	27	6	225
Percent	**19**	**4**	**4**	**6**	**7**	**22**	**6**	**8**	**8**	**3**	**12**	**3**	**100**
Total	59	15	13	15	21	74	18	33	29	13	38	11	339
Percent	**17**	**4**	**4**	**4**	**6**	**22**	**5**	**10**	**9**	**4**	**11**	**3**	**100**

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PRI_Q11_3 & TRE_Q12_3. I do not have the expertise

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	22	5	7	8	6	16	4	22	3	2	13	6	114
Percent	**19**	**4**	**6**	**7**	**5**	**14**	**4**	**19**	**3**	**2**	**11**	**5**	**100**
Treatment	42	10	8	13	8	53	11	21	14	7	32	6	225
Percent	**19**	**4**	**4**	**6**	**4**	**24**	**5**	**9**	**6**	**3**	**14**	**3**	**100**
Total	64	15	15	21	14	69	15	43	17	9	45	12	339
Percent	**19**	**4**	**4**	**6**	**4**	**20**	**4**	**13**	**5**	**3**	**13**	**4**	**100**

PRI_Q11_4 & TRE_Q12_4. I do not have enough information to make a decision or understand the impacts of these improvements or behaviors

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	22	7	7	1	4	19	6	16	10	3	14	5	114
Percent	**19**	**6**	**6**	**1**	**4**	**17**	**5**	**14**	**9**	**3**	**12**	**4**	**100**
Treatment	37	13	13	11	8	52	8	18	15	8	32	10	225
Percent	**16**	**6**	**6**	**5**	**4**	**23**	**4**	**8**	**7**	**4**	**14**	**4**	**100**
Total	59	20	20	12	12	71	14	34	25	11	46	15	339
Percent	**17**	**6**	**6**	**4**	**4**	**21**	**4**	**10**	**7**	**3**	**14**	**4**	**100**

PRI_Q11_5 & TRE_Q12_5. Getting everyone in the house to cooperate is too hard

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	34	7	3	2	5	12	4	12	9	3	20	3	114
Percent	**30**	**6**	**3**	**2**	**4**	**11**	**4**	**11**	**8**	**3**	**18**	**3**	**100**
Treatment	53	12	11	5	6	42	7	19	16	10	38	6	225
Percent	**24**	**5**	**5**	**2**	**3**	**19**	**3**	**8**	**7**	**4**	**17**	**3**	**100**
Total	87	19	14	7	11	54	11	31	25	13	58	9	339
Percent	**26**	**6**	**4**	**2**	**3**	**16**	**3**	**9**	**7**	**4**	**17**	**3**	**100**

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PRI_Q11_6 & TRE_Q12_6. I do not think my energy saving efforts are worth the time and/or money

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	26	4	5	3	5	19	4	4	10	3	28	3	114
Percent	23	4	4	3	4	17	4	4	9	3	25	3	100
Treatment	47	12	15	5	8	30	9	20	19	11	42	7	225
Percent	21	5	7	2	4	13	4	9	8	5	19	3	100
Total	73	16	20	8	13	49	13	24	29	14	70	10	339
Percent	22	5	6	2	4	14	4	7	9	4	21	3	100

PRI_Q12 Which of the following do you do with regard to your household's energy use? Check all that apply.

PRI_Q12_1 Track monthly energy use

Group	Not Checked	Checked	Total
Control	98	90	188
Percent	52	48	100
Treatment	82	89	171
Percent	48	52	100
Total	180	179	359
Percent	50	50	100

PRI_Q12_2 Track the total amount of your bill

Group	Not Checked	Checked	Total
Control	58	130	188
Percent	31	69	100
Treatment	50	121	171
Percent	29	71	100
Total	108	251	359
Percent	30	70	100

PRI_Q12_3 Compare usage to previous months

Group	Not Checked	Checked	Total
Control	59	129	188
Percent	31	69	100
Treatment	53	118	171
Percent	31	69	100
Total	112	247	359
Percent	31	69	100

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PRI_Q12_4 Compare usage to the same month from last year

Group	Not Checked	Checked	Total
Control	83	105	188
Percent	44	56	100
Treatment	58	113	171
Percent	34	66	100
Total	141	218	359
Percent	39	61	100

PRI_Q12_5 None of the above

Group	Not Checked	Checked	Total
Control	174	14	188
Percent	93	7	100
Treatment	154	17	171
Percent	90	10	100
Total	328	31	359
Percent	91	9	100

PRI_Q13. Thinking about the information you could have about your home's energy use, please rate how useful each of the following items would be for your household.

PRI_Q13_1. Your home's energy use compared to that of similar homes

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	19	3	4	5	3	22	6	19	26	24	52	9	192
Percent	10	2	2	3	2	11	3	10	14	13	27	5	100
Treatment	23	3	4	7	4	16	14	19	18	19	46	3	176
Percent	13	2	2	4	2	9	8	11	10	11	26	2	100
Total	42	6	8	12	7	38	20	38	44	43	98	12	368
Percent	11	2	2	3	2	10	5	10	12	12	27	3	100

PRI_Q13_2. Tips to help you save money and energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	14	3	3	0	5	20	6	15	22	31	69	4	192
Percent	7	2	2	0	3	10	3	8	11	16	36	2	100
Treatment	9	2	2	2	4	22	8	10	28	26	60	3	176
Percent	5	1	1	1	2	13	5	6	16	15	34	2	100
Total	23	5	5	2	9	42	14	25	50	57	129	7	368
Percent	6	1	1	1	2	11	4	7	14	15	35	2	100

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PRI_Q13_3. Examples of the energy use associated with common household items

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	14	6	2	3	5	22	9	21	24	19	59	8	192
Percent	7	3	1	2	3	11	5	11	13	10	31	4	100
Treatment	11	3	1	2	6	25	9	16	32	24	44	3	176
Percent	6	2	1	1	3	14	5	9	18	14	25	2	100
Total	25	9	3	5	11	47	18	37	56	43	103	11	368
Percent	7	2	1	1	3	13	5	10	15	12	28	3	100

PRI_Q13_4. Customized suggestions for your home

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	23	3	6	3	8	23	8	21	15	21	52	9	192
Percent	12	2	3	2	4	12	4	11	8	11	27	5	100
Treatment	11	3	3	4	4	25	9	16	22	22	53	4	176
Percent	6	2	2	2	2	14	5	9	13	13	30	2	100
Total	34	6	9	7	12	48	17	37	37	43	105	13	368
Percent	9	2	2	2	3	13	5	10	10	12	29	4	100

PRI_Q13_5. Graphs that display your home's energy use over time

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	20	2	3	0	4	17	5	15	27	21	71	7	192
Percent	10	1	2	0	2	9	3	8	14	11	37	4	100
Treatment	12	4	1	2	3	14	11	13	30	25	59	2	176
Percent	7	2	1	1	2	8	6	7	17	14	34	1	100
Total	32	6	4	2	7	31	16	28	57	46	130	9	368
Percent	9	2	1	1	2	8	4	8	15	13	35	2	100

PRI_Q13_6. Information about services and offers from Duke Energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	19	1	4	0	5	22	9	22	23	23	58	6	192
Percent	10	1	2	0	3	11	5	11	12	12	30	3	100
Treatment	10	4	1	5	7	22	8	22	26	17	50	4	176
Percent	6	2	1	3	4	13	5	13	15	10	28	2	100
Total	29	5	5	5	12	44	17	44	49	40	108	10	368
Percent	8	1	1	1	3	12	5	12	13	11	29	3	100

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PRI_Q14. The statements below provide reasons why households might try to reduce their home's energy use. Please indicate how important each statement is to you.

PRI_Q14_1. Reducing my energy bill(s)

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	4	2	1	0	0	11	2	7	14	28	122	1	192
Percent	2	1	1	0	0	6	1	4	7	15	64	1	100
Treatment	3	0	1	1	2	5	4	4	21	27	107	1	176
Percent	2	0	1	1	1	3	2	2	12	15	61	1	100
Total	7	2	2	1	2	16	6	11	35	55	229	2	368
Percent	2	1	1	0	1	4	2	3	10	15	62	1	100

PRI_Q14_2. Helping the environment

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	9	1	2	3	2	17	9	13	23	13	95	5	192
Percent	5	1	1	2	1	9	5	7	12	7	49	3	100
Treatment	7	0	3	5	3	10	9	14	16	24	84	1	176
Percent	4	0	2	3	2	6	5	8	9	14	48	1	100
Total	16	1	5	8	5	27	18	27	39	37	179	6	368
Percent	4	0	1	2	1	7	5	7	11	10	49	2	100

PRI_Q14_3. Setting an example for others

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	28	4	2	7	6	21	9	13	21	16	59	6	192
Percent	15	2	1	4	3	11	5	7	11	8	31	3	100
Treatment	23	6	3	7	7	22	12	12	19	15	46	4	176
Percent	13	3	2	4	4	13	7	7	11	9	26	2	100
Total	51	10	5	14	13	43	21	25	40	31	105	10	368
Percent	14	3	1	4	4	12	6	7	11	8	29	3	100

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PRI_Q14_4. Avoiding waste

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	7	2	3	2	0	12	5	7	29	22	101	2	192
Percent	4	1	2	1	0	6	3	4	15	11	53	1	100
Treatment	4	0	2	1	3	11	6	11	22	25	89	2	176
Percent	2	0	1	1	2	6	3	6	13	14	51	1	100
Total	11	2	5	3	3	23	11	18	51	47	190	4	368
Percent	3	1	1	1	1	6	3	5	14	13	52	1	100

PRI_Q14_5. Conserving energy resources

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Total
Control	8	1	2	1	1	15	7	15	25	17	95	5	192
Percent	4	1	1	1	1	8	4	8	13	9	49	3	100
Treatment	4	0	2	2	2	15	7	8	24	25	85	2	176
Percent	2	0	1	1	1	9	4	5	14	14	48	1	100
Total	12	1	4	3	3	30	14	23	49	42	180	7	368
Percent	3	0	1	1	1	8	4	6	13	11	49	2	100

PRI_Q15. Please indicate your level of agreement with each of the following statements

PRI_Q15_1. Duke Energy provides excellent customer service

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	7	9	22	69	83	2	192
Percent	4	5	11	36	43	1	100
Treatment	2	10	23	62	78	1	176
Percent	1	6	13	35	44	1	100
Total	9	19	45	131	161	3	368
Percent	2	5	12	36	44	1	100

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PRI_Q15_2. Duke Energy respects its customers

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	8	11	26	57	88	2	192
Percent	4	6	14	30	46	1	100
Treatment	4	9	32	54	76	1	176
Percent	2	5	18	31	43	1	100
Total	12	20	58	111	164	3	368
Percent	3	5	16	30	45	1	100

PRI_Q15_3. Duke Energy provides service at a reasonable cost

Group	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree	No Response	Total
Control	6	25	43	69	44	5	192
Percent	3	13	22	36	23	3	100
Treatment	5	27	24	86	33	1	176
Percent	3	15	14	49	19	1	100
Total	11	52	67	155	77	6	368
Percent	3	14	18	42	21	2	100

PRI_Q16. Before today, were you aware that you could order free or discounted lighting products through the Duke Energy website?

Group	Yes	No	No Response	Total
Control	39	150	3	192
Percent	20	78	2	100
Treatment	39	134	3	176
Percent	22	76	2	100
Total	78	284	6	368
Percent	21	77	2	100

PRI_Q16a. How many free light bulbs have you ordered through the Duke Energy website this year?

Group	0	1	4	6	10	12	14	30	Missing	Total
Control	32	1	0	0	0	1	0	0	5	39
Percent	82	3	0	0	0	3	0	0	13	100
Treatment	32	0	1	1	1	0	1	1	2	39
Percent	82	0	3	3	3	0	3	3	5	100
Total	64	1	1	1	1	1	1	1	7	78
Percent	82	1	1	1	1	1	1	1	9	100

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PRI_Q16b. How many discounted light bulbs have you ordered through the Duke Energy website this year?

Group	0	6	10	12	20	24	25	30	Missing	Total
Control	32	0	0	1	0	1	1	0	4	39
Percent	82	0	0	3	0	3	3	0	10	100
Treatment	33	1	1	0	1	0	0	1	2	39
Percent	85	3	3	0	3	0	0	3	5	100
Total	65	1	1	1	1	1	1	1	6	78
Percent	83	1	1	1	1	1	1	1	8	100

PRI_Q18 & TRE_Q13. Do you own or rent this residence?

Group	Own	Rent	Missing	No Response	Total
Control	161	21	8	2	192
Percent	84	11	4	1	100
Treatment	310	24	10	3	347
Percent	89	7	3	1	100
Total	471	45	18	5	539
Percent	87	8	3	1	100

PRI_Q19 & TRE_Q14. Including yourself, how many people live in your home?

Group	1	2	3	4	5	6	7	8	9	19	No Response	Missing	Total
Control	49	66	28	22	11	4	0	1	1	1	1	8	192
Percent	26	34	15	11	6	2	0	1	1	1	1	4	100
Treatment	65	155	39	47	17	5	1	0	0	1	7	10	347
Percent	19	45	11	14	5	1	0	0	0	0	2	3	100
Total	114	221	67	69	28	9	1	1	1	2	8	18	539
Percent	21	41	12	13	5	2	0	0	0	0	1	3	100

PRI_Q22 & TRE_Q17. What is your primary heating fuel?

Group	Electricity	Natural Gas	Oil	Other	Don't know	No Response	Missing	Total
Control	107	63	1	9	3	1	8	192
Percent	56	33	1	5	2	1	4	100
Treatment	188	103	8	23	3	3	19	347
Percent	54	30	2	7	1	1	5	100
Total	295	166	9	32	6	4	27	539
Percent	55	31	2	6	1	1	5	100

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TRE_Q1. Duke Energy sends a personalized report called My Home Energy Report to a select group of homes. These reports are mailed in a standard envelope every few months and are meant to provide you with information on how your home's electric energy usage compares with similar homes. Have you seen one of these reports?

Group	Yes	No	No Response	Total
Treatment	160	10	1	171
Percent	**94**	**6**	**1**	**100**

TRE_Q2. About how many My Home Energy Reports have you received in the past 12 months?

Group	1	2	3	4	5	6	7	8	9	10	11	12	No Response	Missing	Total
Treatment	4	14	14	29	6	21	2	8	2	9	1	37	13	1	161
Percent	**2**	**9**	**9**	**18**	**4**	**13**	**1**	**5**	**1**	**6**	**1**	**23**	**8**	**1**	**100**

TRE_Q3. How often do you read the My Home Energy Reports?

Group	Always	Sometimes	Never	No Response	Missing	Total
Treatment	107	42	10	1	1	161
Percent	**66**	**26**	**6**	**1**	**1**	**100**

TRE_Q4. How much do you agree or disagree with the following statements about My Home Energy Reports?

TRE_Q4_1. I have learned about my household's energy use from My Home Energy Reports.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	2	2	4	2	16	10	14	19	22	52	1	2	151
Percent	**3**	**1**	**1**	**3**	**1**	**11**	**7**	**9**	**13**	**15**	**34**	**1**	**1**	**100**

TRE_Q4_2. I use the reports to tell me how well I am doing at saving energy.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	6	1	5	10	6	16	6	20	14	19	44	2	2	151
Percent	**4**	**1**	**3**	**7**	**4**	**11**	**4**	**13**	**9**	**13**	**29**	**1**	**1**	**100**

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TRE_Q4_3. The tips provided in the reports are pertinent to my home.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	3	7	10	9	22	15	13	19	15	29	3	2	151
Percent	3	2	5	7	6	15	10	9	13	10	19	2	1	100

TRE_Q4_4. My Home Energy Reports provide the details I need to understand my home's energy use.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	5	2	6	3	6	24	12	14	15	15	44	3	2	151
Percent	3	1	4	2	4	16	8	9	10	10	29	2	1	100

TRE_Q4_5. I have discussed My Home Energy Reports with others.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	43	19	10	8	6	13	6	10	9	5	18	2	2	151
Percent	28	13	7	5	4	9	4	7	6	3	12	1	1	100

TRE_Q4_6. The information provided about my home's energy use is confusing.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	41	24	17	18	7	13	4	6	7	4	7	1	2	151
Percent	27	16	11	12	5	9	3	4	5	3	5	1	1	100

TRE_Q4_7. I suspect that the "similar" homes that my home is compared to in the Home Energy Reports are not actually like mine.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	15	6	12	13	7	22	7	7	22	9	26	3	2	151
Percent	10	4	8	9	5	15	5	5	15	6	17	2	1	100

TRE_Q4_8. Since reading the Home Energy Reports, I have taken actions to use less energy than I would not have otherwise taken.

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	13	5	6	9	7	27	10	17	16	12	26	1	2	151
Percent	9	3	4	6	5	18	7	11	11	8	17	1	1	100

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TRE_Q6. Please rate how useful each feature of the Home Energy Report is to you.

TRE_Q6_1. Comparison to similar homes

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	19	10	3	7	12	21	7	17	18	7	25	3	2	151
Percent	13	7	2	5	8	14	5	11	12	5	17	2	1	100

TRE_Q6_2. Tips to help you save money and energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	3	7	4	3	8	20	8	16	22	17	38	3	2	151
Percent	2	5	3	2	5	13	5	11	15	11	25	2	1	100

TRE_Q6_3. Examples of the energy use associated with common household items

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	8	3	3	2	3	30	10	15	24	13	35	3	2	151
Percent	5	2	2	1	2	20	7	10	16	9	23	2	1	100

TRE_Q6_4. Customized suggestions for your home

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	4	11	2	12	25	9	16	20	13	31	2	2	151
Percent	3	3	7	1	8	17	6	11	13	9	21	1	1	100

TRE_Q6_5. Graphs that display your home's energy use over time

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	3	3	1	5	5	12	10	13	24	20	51	2	2	151
Percent	2	2	1	3	3	8	7	9	16	13	34	1	1	100

TRE_Q6_6. Information about services and offers from Duke Energy

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	7	8	5	13	21	8	14	19	16	30	4	2	151
Percent	3	5	5	3	9	14	5	9	13	11	20	3	1	100

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TRE_Q7. Overall, how satisfied are you with the information in the My Home Energy Reports you've received?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	4	2	0	15	6	0	10	18	19	15	43	17	2	151
Percent	**3**	**1**	**0**	**10**	**4**	**0**	**7**	**12**	**13**	**10**	**28**	**11**	**1**	**100**

TRE_Q8. Are you aware that you can go online to My Home Energy Interactive to access more information, above and beyond that found in the My Home Energy Report, which describes more ways to save energy?

Group	Yes	No	No Response	Missing	Total
Treatment	50	93	6	2	151
Percent	**33**	**62**	**4**	**1**	**100**

TRE_Q8a. Have you signed up to use My Home Energy Interactive?

Group	Yes	No	Missing	Total
Treatment	7	44	7	58
Percent	**12**	**76**	**12**	**100**

TRE_Q8b. How useful is My Home Energy Interactive to you for saving energy?

Group	0	1	2	3	4	5	6	7	8	9	10	No Response	Missing	Total
Treatment	0	0	1	0	0	1	1	0	2	1	1	0	7	14
Percent	**0**	**0**	**7**	**0**	**0**	**7**	**7**	**0**	**14**	**7**	**7**	**0**	**50**	**100**

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Appendix F   Detailed Regression Outputs/Models

Table F-1: Regression Coefficients for DEC Cohort 1

Number of obs	=	1762110
F(211,1746190)	=	3462.28
Prob>F	=	0.0000
R-squared	=	0.6990
AdjR-squared	=	0.6963
Root MSE	=	14.2230

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2008	5.191487	.2007457	25.86	0.000	4.798033	5.584942
01/2009	8.474034	.2007376	42.21	0.000	8.080595	8.867473
02/2009	4.944045	.2007376	24.63	0.000	4.550607	5.337484
03/2009	-4.473073	.2007376	-22.28	0.000	-4.866511	-4.079634
04/2009	-10.36862	.2007399	-51.65	0.000	-10.76206	-9.975177
05/2009	-5.134012	.2007376	-25.58	0.000	-5.52745	-4.740573
06/2009	8.447003	.2007622	42.07	0.000	8.053516	8.84049
07/2009	12.29769	.2007376	61.26	0.000	11.90425	12.69113
08/2009	10.50211	.2007376	52.32	0.000	10.10867	10.89554
09/2009	-1.928812	.2007376	-9.61	0.000	-2.322251	-1.535373
10/2009	-10.3154	.2007376	-51.39	0.000	-10.70884	-9.921959
11/2009	-5.556012	.2007376	-27.68	0.000	-5.949451	-5.162574
12/2009	12.49879	.2007376	62.26	0.000	12.10535	12.89222
01/2010	17.97165	.2007376	89.53	0.000	17.57821	18.36509
02/2010	12.75866	.2007376	63.56	0.000	12.36522	13.1521
03/2010	-2.580372	.2007376	-12.85	0.000	-2.973811	-2.186933
05/2010	-1.914499	.2193415	-8.73	0.000	-2.3444	-1.484597
06/2010	13.97785	.2193415	63.73	0.000	13.54795	14.40775
07/2010	21.27298	.2193415	96.99	0.000	20.84308	21.70289
08/2010	16.37607	.2193517	74.66	0.000	15.94615	16.806
09/2010	3.002323	.2193415	13.69	0.000	2.572421	3.432225
10/2010	-10.85536	.2193415	-49.49	0.000	-11.28526	-10.42546
11/2010	-2.931544	.2193415	-13.37	0.000	-3.361445	-2.501642
12/2010	15.42983	.2193415	70.35	0.000	14.99993	15.85973
01/2011	16.05199	.2193467	73.18	0.000	15.62208	16.4819
02/2011	1.516525	.2193467	6.91	0.000	1.086613	1.946437

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03/2011	-8.668877	.2193467	-39.52	0.000	-9.098789	-8.238966
04/2011	-10.7024	.2193467	-48.79	0.000	-11.13231	-10.27249
05/2011	-2.066455	.2193467	-9.42	0.000	-2.496367	-1.636544
06/2011	11.27938	.2193467	51.42	0.000	10.84947	11.70929
07/2011	18.50946	.2193467	84.38	0.000	18.07955	18.93937
08/2011	15.38748	.2193467	70.15	0.000	14.95757	15.81739
09/2011	-2.419517	.2193467	-11.03	0.000	-2.849429	-1.989605
10/2011	-11.95917	.2193467	-54.52	0.000	-12.38908	-11.52925
11/2011	-6.773594	.2193467	-30.88	0.000	-7.203506	-6.343682
12/2011	.3503983	.2193467	1.60	0.110	-.0795136	.7803101
01/2012	2.137307	.2193467	9.74	0.000	1.707396	2.567219
02/2012	-2.023987	.2193467	-9.23	0.000	-2.453899	-1.594075
03/2012	-10.96786	.2193467	-50.00	0.000	-11.39777	-10.53795
04/2012	-12.02501	.2193467	-54.82	0.000	-12.45493	-11.5951
05/2012	-5.344883	.2193467	-24.37	0.000	-5.774795	-4.914972
06/2012	5.043491	.2193467	22.99	0.000	4.613579	5.473403
07/2012	15.05386	.2193467	68.63	0.000	14.62395	15.48378
08/2012	7.429274	.2193467	33.87	0.000	6.999362	7.859186
09/2012	-4.481343	.2193467	-20.43	0.000	-4.911255	-4.051431
10/2012	-11.71996	.2193467	-53.43	0.000	-12.14987	-11.29005
11/2012	-3.644662	.2193467	-16.62	0.000	-4.074574	-3.21475
12/2012	-.3900915	.2193467	-1.78	0.075	-.8200034	.0398203
01/2013	3.125439	.2193467	14.25	0.000	2.695527	3.555351
02/2013	4.334034	.2193467	19.76	0.000	3.904122	4.763946
03/2013	-1.639171	.2193467	-7.47	0.000	-2.069083	-1.209259
04/2013	-10.92128	.2193467	-49.79	0.000	-11.3512	-10.49137
05/2013	-9.073495	.2193467	-41.37	0.000	-9.503407	-8.643583
06/2013	1.977657	.2193467	9.02	0.000	1.547745	2.407569
07/2013	6.9278	.2193467	31.58	0.000	6.497888	7.357712
08/2013	4.202586	.2193467	19.16	0.000	3.772674	4.632497
09/2013	-3.535703	.2193467	-16.12	0.000	-3.965615	-3.105791
10/2013	-12.08457	.2193467	-55.09	0.000	-12.51448	-11.65466
11/2013	-4.151322	.2193467	-18.93	0.000	-4.581234	-3.72141
12/2013	5.982545	.2193467	27.27	0.000	5.552633	6.412457
01/2014	13.94471	.2193467	63.57	0.000	13.5148	14.37462
02/2014	6.439797	.2193467	29.36	0.000	6.009885	6.869709
03/2014	-4.763844	.2193467	-21.72	0.000	-5.193755	-4.333932
04/2014	-11.30048	.2193467	-51.52	0.000	-11.73039	-10.87057
05/2014	-5.923049	.2193518	-27.00	0.000	-6.352971	-5.493127
06/2014	5.586936	.2193518	25.47	0.000	5.157014	6.016858
07/2014	6.807551	.2193518	31.03	0.000	6.377629	7.237473

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08/2014	4.594464	.2193467	20.95	0.000	4.164553	5.024376
09/2014	-2.844089	.2193467	-12.97	0.000	-3.274001	-2.414177
10/2014	-12.83725	.2193467	-58.52	0.000	-13.26717	-12.40734
11/2014	-3.794079	.2193467	-17.30	0.000	-4.223991	-3.364168
12/2014	5.624176	.2193415	25.64	0.000	5.194275	6.054078
01/2015	7.697574	.2193415	35.09	0.000	7.267672	8.127475
02/2015	8.480056	.2193415	38.66	0.000	8.050154	8.909958
03/2015	-6.031693	.2193415	-27.50	0.000	-6.461595	-5.601791
04/2015	-13.39654	.2193415	-61.08	0.000	-13.82644	-12.96664
05/2015	-5.456317	.2193415	-24.88	0.000	-5.886219	-5.026415
06/2015	7.45144	.2193415	33.97	0.000	7.021538	7.881341
07/2015	13.00821	.2193415	59.31	0.000	12.57831	13.43811
08/2015	8.063715	.2193415	36.76	0.000	7.633813	8.493616
09/2015	-5.04434	.2193415	-23.00	0.000	-5.474241	-4.614438
10/2015	-14.22894	.2193415	-64.87	0.000	-14.65884	-13.79903
11/2015	-10.26639	.2193415	-46.81	0.000	-10.69629	-9.836487
12/2015	-4.744726	.2193415	-21.63	0.000	-5.174627	-4.314824
01/2016	4.96105	.2193465	22.62	0.000	4.531139	5.390962
02/2016	2.108975	.2193816	9.61	0.000	1.678995	2.538955
03/2016	-11.48936	.2195124	-52.34	0.000	-11.9196	-11.05912
04/2016	-13.86226	.2197353	-63.09	0.000	-14.29294	-13.43159
05/2016	-7.251094	.2199293	-32.97	0.000	-7.682147	-6.82004
06/2016	7.00792	.2201299	31.84	0.000	6.576473	7.439367
07/2016	15.72801	.2204102	71.36	0.000	15.29602	16.16001
08/2016	11.98578	.2206354	54.32	0.000	11.55334	12.41821
09/2016	1.356097	.220921	6.14	0.000	.9230997	1.789095
10/2016	-12.62069	.221172	-57.06	0.000	-13.05418	-12.1872
11/2016	-9.658069	.2213335	-43.64	0.000	-10.09188	-9.224264
12/2016	-.6289618	.2215121	-2.84	0.005	-1.063118	-.1948056
01/2017	-2.849558	.2216975	-12.85	0.000	-3.284077	-2.415039
02/2017	-8.607431	.221851	-38.80	0.000	-9.042251	-8.172611
03/2017	-10.77751	.2220055	-48.55	0.000	-11.21263	-10.34238
04/2017	-13.76509	.2222722	-61.93	0.000	-14.20073	-13.32944
05/2017	-8.217315	.2225359	-36.93	0.000	-8.653478	-7.781152
06/2017	1.158951	.2228875	5.20	0.000	.722099	1.595803
07/2017	8.833328	.2231686	39.58	0.000	8.395925	9.270731
08/2017	4.53006	.2234059	20.28	0.000	4.092192	4.967928
09/2017	-5.786104	.2236804	-25.87	0.000	-6.22451	-5.347698
10/2017	-11.066	.2239339	-49.42	0.000	-11.5049	-10.62709
11/2017	-8.475153	.2241597	-37.81	0.000	-8.914499	-8.035808
12/2017	4.758375	.2243693	21.21	0.000	4.318619	5.198131

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01/2018	9.863339	.2246289	43.91	0.000	9.423074	10.3036
02/2018	-5.781853	.2248725	-25.71	0.000	-6.222595	-5.34111
03/2018	-9.912905	.2250997	-44.04	0.000	-10.35409	-9.471718
04/2018	-13.94758	.2253348	-61.90	0.000	-14.38923	-13.50593
05/2018	-6.950921	.2255593	-30.82	0.000	-7.393009	-6.508832
i.ym#c.treatment						
05/2010	-.1910499	.2394967	-0.80	0.425	-.6604551	.2783552
06/2010	-.2860475	.2394967	-1.19	0.232	-.7554527	.1833577
07/2010	-.5401676	.2394967	-2.26	0.024	-1.009573	-.0707624
08/2010	-.4921973	.239506	-2.06	0.040	-.9616208	-.0227738
09/2010	-.463216	.2394967	-1.93	0.053	-.9326212	.0061891
10/2010	-.5357518	.2394967	-2.24	0.025	-1.005157	-.0663467
11/2010	-.1931776	.2394967	-0.81	0.420	-.6625827	.2762276
12/2010	.0610646	.2394967	0.25	0.799	-.4083406	.5304697
01/2011	.0866716	.2395014	0.36	0.717	-.3827428	.556086
02/2011	.0078406	.2395126	0.03	0.974	-.4615958	.477277
03/2011	-.454115	.2395126	-1.90	0.058	-.9235514	.0153213
04/2011	-.484397	.2395126	-2.02	0.043	-.9538333	-.0149606
05/2011	-.7348654	.2395238	-3.07	0.002	-1.204324	-.2654072
06/2011	-.5874111	.2395126	-2.45	0.014	-1.056847	-.1179747
07/2011	-.8212494	.2395126	-3.43	0.001	-1.290686	-.3518131
08/2011	-.6037938	.2395126	-2.52	0.012	-1.07323	-.1343574
09/2011	-.5673285	.2395126	-2.37	0.018	-1.036765	-.0978922
10/2011	-.5760798	.2395126	-2.41	0.016	-1.045516	-.1066434
11/2011	-.4092845	.2395126	-1.71	0.087	-.8787209	.0601518
12/2011	-.3575161	.2395126	-1.49	0.136	-.8269524	.1119203
01/2012	-.2747792	.2395126	-1.15	0.251	-.7442156	.1946571
02/2012	-.3863291	.2395126	-1.61	0.107	-.8557654	.0831073
03/2012	-.556866	.2395126	-2.32	0.020	-1.026302	-.0874297
04/2012	-.685426	.2395126	-2.86	0.004	-1.154862	-.2159896
05/2012	-.5552546	.2395126	-2.32	0.020	-1.024691	-.0858182
06/2012	-.6511456	.2395126	-2.72	0.007	-1.120582	-.1817092
07/2012	-.5138519	.2395126	-2.15	0.032	-.9832883	-.0444155
08/2012	-.6455145	.2395126	-2.70	0.007	-1.114951	-.1760781
09/2012	-.5557067	.2395126	-2.32	0.020	-1.025143	-.0862704
10/2012	-.6565749	.2395014	-2.74	0.006	-1.125989	-.1871605
11/2012	-.983766	.2395014	-4.11	0.000	-1.45318	-.5143516
12/2012	-.4109544	.2395014	-1.72	0.086	-.8803688	.05846
01/2013	-.2759519	.2395014	-1.15	0.249	-.7453663	.1934625
02/2013	-.3054777	.2395014	-1.28	0.202	-.7748921	.1639367

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03/2013	-.5427792	.2395014	-2.27	0.023	-1.012194	-.0733648
04/2013	-.582956	.2395014	-2.43	0.015	-1.05237	-.1135416
05/2013	-.7678896	.2395014	-3.21	0.001	-1.237304	-.2984752
06/2013	-.8816336	.2395014	-3.68	0.000	-1.351048	-.4122192
07/2013	-1.034716	.2395014	-4.32	0.000	-1.504131	-.565302
08/2013	-.9875511	.2395014	-4.12	0.000	-1.456966	-.5181367
09/2013	-.6532961	.2395014	-2.73	0.006	-1.122711	-.1838818
10/2013	-.6239904	.2395014	-2.61	0.009	-1.093405	-.154576
11/2013	-.3569448	.2395014	-1.49	0.136	-.8263592	.1124696
12/2013	-.1515506	.2395014	-0.63	0.527	-.620965	.3178638
01/2014	-.2228782	.2395014	-0.93	0.352	-.6922926	.2465362
02/2014	-.1320108	.2395014	-0.55	0.582	-.6014252	.3374036
03/2014	-.36386	.2395014	-1.52	0.129	-.8332744	.1055544
04/2014	-.6727505	.2395014	-2.81	0.005	-1.142165	-.2033362
05/2014	-.6869799	.2395061	-2.87	0.004	-1.156403	-.2175563
06/2014	-.9441145	.2395061	-3.94	0.000	-1.413538	-.474691
07/2014	-.9629565	.2395061	-4.02	0.000	-1.43238	-.4935329
08/2014	-.9183834	.2395014	-3.83	0.000	-1.387798	-.448969
09/2014	-.7614144	.2395014	-3.18	0.001	-1.230829	-.292
10/2014	-.6365438	.2395014	-2.66	0.008	-1.105958	-.1671294
11/2014	-.4433267	.2395014	-1.85	0.064	-.9127411	.0260877
12/2014	-.2697246	.2394967	-1.13	0.260	-.7391298	.1996806
01/2015	-.2573507	.2394967	-1.07	0.283	-.7267559	.2120545
02/2015	-.3339995	.2394967	-1.39	0.163	-.8034046	.1354057
03/2015	-.5212122	.2394967	-2.18	0.030	-.9906174	-.0518071
04/2015	-.6320871	.2394967	-2.64	0.008	-1.101492	-.1626819
05/2015	-.6295939	.2394967	-2.63	0.009	-1.098999	-.1601887
06/2015	-.5415726	.2394967	-2.26	0.024	-1.010978	-.0721674
07/2015	-.4877207	.2394967	-2.04	0.042	-.9571259	-.0183156
08/2015	-.5460176	.2394967	-2.28	0.023	-1.015423	-.0766125
09/2015	-.6018334	.2394967	-2.51	0.012	-1.071239	-.1324282
10/2015	-.6344547	.2394967	-2.65	0.008	-1.10386	-.1650496
11/2015	-.4519346	.2394967	-1.89	0.059	-.9213398	.0174705
12/2015	-.2701377	.2394967	-1.13	0.259	-.7395429	.1992674
01/2016	-.0118044	.2395238	-0.05	0.961	-.4812627	.457654
02/2016	.0119737	.2396241	0.05	0.960	-.4576812	.4816286
03/2016	-.3992353	.2399267	-1.66	0.096	-.8694835	.0710128
04/2016	-.5908526	.2403388	-2.46	0.014	-1.061908	-.1197969
05/2016	-.6390015	.2408954	-2.65	0.008	-1.111148	-.1668549
06/2016	-.6533725	.2413804	-2.71	0.007	-1.12647	-.1802753
07/2016	-.6972425	.2419413	-2.88	0.004	-1.171439	-.223046

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08/2016	-.5881896	.2424409	-2.43	0.015	-1.063365	-.1130138
09/2016	-.533938	.2431858	-2.20	0.028	-1.010574	-.0573022
10/2016	-.6331126	.243749	-2.60	0.009	-1.110852	-.1553731
11/2016	-.4772002	.2442789	-1.95	0.051	-.9559785	.001578
12/2016	-.3995216	.2446356	-1.63	0.102	-.8789989	.0799558
01/2017	-.5412792	.244975	-2.21	0.027	-1.021422	-.0611367
02/2017	-.4773872	.2453217	-1.95	0.052	-.9582092	.0034348
03/2017	-.5299467	.2456578	-2.16	0.031	-1.011427	-.048466
04/2017	-.6764316	.2462687	-2.75	0.006	-1.15911	-.1937534
05/2017	-.6656495	.2469533	-2.70	0.007	-1.149669	-.1816296
06/2017	-.7430946	.2477597	-3.00	0.003	-1.228695	-.2574941
07/2017	-.723818	.2483676	-2.91	0.004	-1.21061	-.2370262
08/2017	-.7733249	.2489882	-3.11	0.002	-1.261333	-.2853167
09/2017	-.9654595	.2495057	-3.87	0.000	-1.454482	-.476437
10/2017	-.725397	.2499668	-2.90	0.004	-1.215323	-.2354707
11/2017	-.6503956	.2504678	-2.60	0.009	-1.141304	-.1594875
12/2017	-.6432011	.2509038	-2.56	0.010	-1.134964	-.1514384
01/2018	-.8176798	.2513993	-3.25	0.001	-1.310414	-.3249459
02/2018	-.7727947	.2518814	-3.07	0.002	-1.266473	-.2791159
03/2018	-.7919056	.2523102	-3.14	0.002	-1.286425	-.2973863
04/2018	-.6624927	.2527603	-2.62	0.009	-1.157894	-.1670912
05/2018	-.7587147	.2532945	-3.00	0.003	-1.255163	-.2622664
06/2018	-.8077236	.2681764	-3.01	0.003	-1.33334	-.2821072
cons	45.77712	.1655728	276.48	0.000	45.4526	46.10163

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Table F-2: Regression Coefficients for DEC Cohort 2

Number of obs	=	66019536
F(184,65383332)	=	107813.97
Prob>F	=	0.0000
R-squared	=	0.6861
AdjR-squared	=	0.6831
Root MSE	=	14.5232

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2008	15.60621	3.538483	4.41	0.000	8.670906	22.54151
01/2009	18.55965	3.538483	5.25	0.000	11.62435	25.49495
02/2009	15.16359	3.538483	4.29	0.000	8.228292	22.09889
03/2009	6.65773	3.538483	1.88	0.060	-.2775681	13.59303
04/2009	.6109856	3.538482	0.17	0.863	-6.324312	7.546284
05/2009	4.159499	3.538482	1.18	0.240	-2.775798	11.0948
06/2009	14.83888	3.538482	4.19	0.000	7.903585	21.77418
07/2009	18.6593	3.538481	5.27	0.000	11.72401	25.5946
08/2009	17.93512	3.538481	5.07	0.000	10.99982	24.87041
09/2009	6.611174	3.538481	1.87	0.062	-.3241207	13.54647
10/2009	.494279	3.53848	0.14	0.889	-6.441015	7.429573
11/2009	5.650804	3.53848	1.60	0.110	-1.28449	12.5861
12/2009	21.0607	3.53848	5.95	0.000	14.1254	27.99599
01/2010	25.40384	3.53848	7.18	0.000	18.46855	32.33914
02/2010	21.15344	3.538479	5.98	0.000	14.21814	28.08873
03/2010	7.036302	3.538479	1.99	0.047	.1010102	13.97159
04/2010	-.1561714	3.538479	-0.04	0.965	-7.091462	6.779119
05/2010	6.554885	3.538478	1.85	0.064	-.3804053	13.49017
06/2010	20.61625	3.538478	5.83	0.000	13.68096	27.55154
07/2010	26.5117	3.538477	7.49	0.000	19.57641	33.44699
08/2010	22.42108	3.538477	6.34	0.000	15.48579	29.35637
09/2010	10.95032	3.538477	3.09	0.002	4.015031	17.88561
10/2010	.0531436	3.538477	0.02	0.988	-6.882143	6.988431
11/2010	7.951184	3.538476	2.25	0.025	1.015897	14.88647
12/2010	24.3034	3.538476	6.87	0.000	17.36811	31.23868
01/2011	24.59635	3.538476	6.95	0.000	17.66107	31.53164
02/2011	12.14872	3.538476	3.43	0.001	5.213439	19.08401
03/2011	3.271488	3.538475	0.92	0.355	-3.663796	10.20677
04/2011	.0254961	3.538475	0.01	0.994	-6.909788	6.96078
05/2011	6.722884	3.538475	1.90	0.057	-.2123994	13.65817
06/2011	18.30611	3.538475	5.17	0.000	11.37082	25.24139

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07/2011	24.57749	3.538474	6.95	0.000	17.6422	31.51277
08/2011	21.24229	3.538474	6.00	0.000	14.307	28.17757
09/2011	6.32984	3.538474	1.79	0.074	-.605441	13.26512
10/2011	-.7090731	3.538473	-0.20	0.841	-7.644354	6.226207
11/2011	4.789263	3.538473	1.35	0.176	-2.146016	11.72454
12/2011	11.08201	3.538473	3.13	0.002	4.146733	18.01729
01/2012	12.99586	3.538472	3.67	0.000	6.060582	19.93114
02/2012	9.304971	3.538472	2.63	0.009	2.369693	16.24025
03/2012	.2922054	3.538472	0.08	0.934	-6.643072	7.227483
04/2012	-1.444199	3.538472	-0.41	0.683	-8.379476	5.491079
05/2012	3.84496	3.538476	1.09	0.277	-3.090325	10.78025
06/2012	13.37637	3.538477	3.78	0.000	6.441086	20.31166
07/2012	22.48779	3.538472	6.36	0.000	15.55251	29.42307
08/2012	15.61638	3.53847	4.41	0.000	8.681104	22.55165
10/2012	-.1389972	3.539339	-0.04	0.969	-7.075974	6.797979
11/2012	6.747932	3.539339	1.91	0.057	-.1890448	13.68491
12/2012	11.72247	3.539339	3.31	0.001	4.785494	18.65945
01/2013	15.2848	3.539339	4.32	0.000	8.347819	22.22177
02/2013	16.0512	3.539339	4.54	0.000	9.114225	22.98818
03/2013	10.31997	3.539329	2.92	0.004	3.383015	17.25693
04/2013	.7307316	3.539329	0.21	0.836	-6.206225	7.667688
05/2013	2.014527	3.539329	0.57	0.569	-4.92243	8.951484
06/2013	10.40249	3.539329	2.94	0.003	3.465537	17.33945
07/2013	15.21497	3.539329	4.30	0.000	8.278016	22.15193
08/2013	12.16316	3.539329	3.44	0.001	5.226203	19.10012
09/2013	4.993709	3.539329	1.41	0.158	-1.943248	11.93067
10/2013	-.5978868	3.539329	-0.17	0.866	-7.534844	6.33907
11/2013	8.227127	3.539329	2.32	0.020	1.29017	15.16408
12/2013	17.12029	3.539329	4.84	0.000	10.18333	24.05724
01/2014	23.99797	3.539329	6.78	0.000	17.06102	30.93493
02/2014	18.12497	3.539329	5.12	0.000	11.18801	25.06192
03/2014	8.762832	3.539329	2.48	0.013	1.825875	15.69979
04/2014	.3260062	3.539329	0.09	0.927	-6.610951	7.262963
05/2014	3.696197	3.539329	1.04	0.296	-3.24076	10.63315
06/2014	13.51021	3.539329	3.82	0.000	6.57325	20.44716
07/2014	13.74943	3.539329	3.88	0.000	6.812471	20.68639
08/2014	12.28417	3.539329	3.47	0.001	5.347213	19.22113
09/2014	5.353721	3.539329	1.51	0.130	-1.583237	12.29068
10/2014	-1.159543	3.539329	-0.33	0.743	-8.096501	5.777415
11/2014	8.391809	3.539329	2.37	0.018	1.454851	15.32877
12/2014	16.67983	3.539329	4.71	0.000	9.742874	23.61679

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01/2015	19.03981	3.539328	5.38	0.000	12.10285	25.97677
02/2015	21.99416	3.539329	6.21	0.000	15.0572	28.93112
03/2015	7.006767	3.539329	1.98	0.048	.0698103	13.94372
04/2015	-1.618107	3.539329	-0.46	0.648	-8.555064	5.31885
05/2015	4.506174	3.539329	1.27	0.203	-2.430783	11.44313
06/2015	16.51763	3.539329	4.67	0.000	9.580674	23.45459
07/2015	20.28945	3.539329	5.73	0.000	13.35249	27.22641
08/2015	15.72859	3.539329	4.44	0.000	8.791636	22.66555
09/2015	4.758353	3.539329	1.34	0.179	-2.178604	11.69531
10/2015	-2.040086	3.539329	-0.58	0.564	-8.977043	4.896871
11/2015	2.449674	3.539329	0.69	0.489	-4.487283	9.386632
12/2015	7.374783	3.539329	2.08	0.037	.4378261	14.31174
01/2016	16.87508	3.539329	4.77	0.000	9.93812	23.81204
02/2016	14.81747	3.53933	4.19	0.000	7.880515	21.75443
03/2016	1.449485	3.539335	0.41	0.682	-5.487484	8.386454
04/2016	-1.655205	3.539341	-0.47	0.640	-8.592187	5.281777
05/2016	2.03059	3.539348	0.57	0.566	-4.906405	8.967584
06/2016	13.63592	3.539355	3.85	0.000	6.698916	20.57293
07/2016	21.68849	3.539363	6.13	0.000	14.75146	28.62551
08/2016	19.69544	3.539369	5.56	0.000	12.75841	26.63248
09/2016	10.20204	3.539377	2.88	0.004	3.264991	17.13909
10/2016	-1.283525	3.539383	-0.36	0.717	-8.220589	5.653538
11/2016	2.897853	3.539389	0.82	0.413	-4.039222	9.834927
12/2016	12.58997	3.539395	3.56	0.000	5.652881	19.52705
01/2017	10.76085	3.539401	3.04	0.002	3.823751	17.69795
02/2017	4.390035	3.539406	1.24	0.215	-2.547074	11.32714
03/2017	2.278205	3.539411	0.64	0.520	-4.658913	9.215322
04/2017	-1.117221	3.539417	-0.32	0.752	-8.05435	5.819909
05/2017	2.517216	3.539423	0.71	0.477	-4.419927	9.454358
06/2017	10.64104	3.539432	3.01	0.003	3.703883	17.5782
07/2017	17.42826	3.539439	4.92	0.000	10.49109	24.36544
08/2017	12.37889	3.539445	3.50	0.000	5.441705	19.31608
09/2017	4.11828	3.539452	1.16	0.245	-2.81892	11.05548
10/2017	-.1526433	3.539458	-0.04	0.966	-7.089855	6.784568
11/2017	4.710299	3.539466	1.33	0.183	-2.226926	11.64752
12/2017	18.23206	3.539472	5.15	0.000	11.29482	25.16929
01/2018	21.79532	3.539477	6.16	0.000	14.85807	28.73257
02/2018	7.776363	3.539483	2.20	0.028	.8391038	14.71362
03/2018	4.591732	3.539489	1.30	0.195	-2.345538	11.529
04/2018	-1.023749	3.539494	-0.29	0.772	-7.961031	5.913532
05/2018	4.715948	3.539501	1.33	0.183	-2.221346	11.65324

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06/2018	8.871852	3.539601	2.51	0.012	1.934362	15.80934
i.ym#c.treatment						
10/2012	-.840534	.0857929	-9.80	0.000	-1.008685	-.672383
11/2012	-.6158147	.0849309	-7.25	0.000	-.7822762	-.4493533
12/2012	-.9676389	.0849346	-11.39	0.000	-1.134108	-.8011701
01/2013	-.6976332	.0849016	-8.22	0.000	-.8640373	-.5312291
02/2013	-.8442805	.0848814	-9.95	0.000	-1.010645	-.6779161
03/2013	-.9611976	.084455	-11.38	0.000	-1.126726	-.7956688
04/2013	-.5014042	.0844052	-5.94	0.000	-.6668354	-.335973
05/2013	-.6168377	.0844077	-7.31	0.000	-.7822737	-.4514016
06/2013	.2525404	.0844003	2.99	0.003	.0871189	.417962
07/2013	.1679476	.0843964	1.99	0.047	.0025337	.3333615
08/2013	-.1075249	.0843856	-1.27	0.203	-.2729176	.0578677
09/2013	.185229	.0843737	2.20	0.028	.0198595	.3505985
10/2013	-.6812523	.0843209	-8.08	0.000	-.8465182	-.5159864
11/2013	-1.086973	.0842983	-12.89	0.000	-1.252195	-.9217514
12/2013	-.9384901	.0842995	-11.13	0.000	-1.103714	-.773266
01/2014	-.8469811	.0842631	-10.05	0.000	-1.012134	-.6818285
02/2014	-1.160827	.0842618	-13.78	0.000	-1.325977	-.9956765
03/2014	-1.102494	.0842631	-13.08	0.000	-1.267647	-.9373415
04/2014	-.8452056	.0842631	-10.03	0.000	-1.010358	-.680053
05/2014	-.3981435	.0842655	-4.72	0.000	-.5633009	-.2329861
06/2014	-.0148477	.084268	-0.18	0.860	-.1800099	.1503146
07/2014	.3927861	.0842692	4.66	0.000	.2276214	.5579508
08/2014	-.3569773	.0842717	-4.24	0.000	-.5221468	-.1918078
09/2014	.146575	.0842717	1.74	0.082	-.0185945	.3117445
10/2014	-.8074913	.0842742	-9.58	0.000	-.9726656	-.642317
11/2014	-.8933922	.0842742	-10.60	0.000	-1.058567	-.7282179
12/2014	-.5790381	.0842482	-6.87	0.000	-.7441616	-.4139147
01/2015	-.753809	.084247	-8.95	0.000	-.9189301	-.5886879
02/2015	-1.536854	.0842507	-18.24	0.000	-1.701982	-1.371726
03/2015	-1.178561	.0842507	-13.99	0.000	-1.343689	-1.013432
04/2015	-.7316073	.0842532	-8.68	0.000	-.8967405	-.5664741
05/2015	-.216203	.0842544	-2.57	0.010	-.3813386	-.0510673
06/2015	-.0699967	.0842557	-0.83	0.406	-.2351348	.0951414
07/2015	.0738049	.0842569	0.88	0.381	-.0913357	.2389455
08/2015	.0956977	.0842583	1.14	0.256	-.0694454	.2608409
09/2015	-.2657058	.0842583	-3.15	0.002	-.430849	-.1005626
10/2015	-.8266346	.0842608	-9.81	0.000	-.9917828	-.6614864
11/2015	-1.18499	.0842609	-14.06	0.000	-1.350139	-1.019842
12/2015	-.8655857	.084261	-10.27	0.000	-1.030734	-.7004371

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01/2016	-.7369833	.0842738	-8.75	0.000	-.9021568	-.5718098
02/2016	-1.372489	.0843195	-16.28	0.000	-1.537752	-1.207226
03/2016	-1.1059	.0845333	-13.08	0.000	-1.271582	-.9402177
04/2016	-.9229459	.0848208	-10.88	0.000	-1.089192	-.7567001
05/2016	-.3351069	.085112	-3.94	0.000	-.5019234	-.1682904
06/2016	.3111512	.0854262	3.64	0.000	.143719	.4785835
07/2016	.416008	.0857828	4.85	0.000	.2478768	.5841393
08/2016	.3587588	.086059	4.17	0.000	.1900863	.5274312
09/2016	-.0348806	.0864056	-0.40	0.686	-.2042326	.1344713
10/2016	-.7398302	.0866785	-8.54	0.000	-.909717	-.5699435
11/2016	-.961785	.0869257	-11.06	0.000	-1.132156	-.7914139
12/2016	-1.424701	.0871976	-16.34	0.000	-1.595605	-1.253797
01/2017	-1.330731	.0874459	-15.22	0.000	-1.502122	-1.159341
02/2017	-.9211357	.0876705	-10.51	0.000	-1.092967	-.7493047
03/2017	-1.004827	.0878734	-11.43	0.000	-1.177056	-.8325988
04/2017	-1.222549	.0881431	-13.87	0.000	-1.395306	-1.049791
05/2017	-.530477	.0884276	-6.00	0.000	-.7037919	-.3571621
06/2017	-.2310028	.088785	-2.60	0.009	-.4050183	-.0569873
07/2017	.164544	.0891015	1.85	0.065	-.0100917	.3391797
08/2017	.1487353	.0893719	1.66	0.096	-.0264303	.3239009
09/2017	-.593236	.0896693	-6.62	0.000	-.7689846	-.4174875
10/2017	-.4416378	.0899238	-4.91	0.000	-.6178851	-.2653905
11/2017	-1.13602	.0902223	-12.59	0.000	-1.312853	-.959188
12/2017	-1.967648	.0904728	-21.75	0.000	-2.144971	-1.790324
01/2018	-1.022046	.0907028	-11.27	0.000	-1.199821	-.8442722
02/2018	-1.24192	.0909442	-13.66	0.000	-1.420167	-1.063672
03/2018	-1.294107	.0911858	-14.19	0.000	-1.472828	-1.115386
04/2018	-1.025383	.0914225	-11.22	0.000	-1.204567	-.8461979
05/2018	-.6825252	.0916871	-7.44	0.000	-.8622286	-.5028219
06/2018	.5910098	.0958751	6.16	0.000	.403098	.7789215
07/2018	4.231694	3.611954	1.17	0.241	-2.847607	11.31099
cons	32.27554	3.538422	9.12	0.000	25.34036	39.21072

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Table F-3: Regression Coefficients for DEC Cohort 3

Number of obs	=	40604310
F(157,40091478)	=	70899.87
Prob>F	=	0.0000
R-squared	=	0.6872
AdjR-squared	=	0.6832
Root MSE	=	14.5430

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2008	4.800107	3.052301	1.57	0.116	-1.182292	10.78251
01/2009	8.610748	3.0523	2.82	0.005	2.628349	14.59315
02/2009	5.412161	3.052299	1.77	0.076	-.5702365	11.39456
03/2009	-3.517968	3.052299	-1.15	0.249	-9.500363	2.464428
04/2009	-8.94665	3.052298	-2.93	0.003	-14.92904	-2.964255
05/2009	-5.550734	3.052297	-1.82	0.069	-11.53313	.4316593
06/2009	5.096909	3.052297	1.67	0.095	-.8854824	11.0793
07/2009	9.083436	3.052296	2.98	0.003	3.101046	15.06583
08/2009	8.128167	3.052295	2.66	0.008	2.145779	14.11055
09/2009	-3.162188	3.052294	-1.04	0.300	-9.144574	2.820198
10/2009	-9.100818	3.052293	-2.98	0.003	-15.0832	-3.118434
11/2009	-4.361905	3.052292	-1.43	0.153	-10.34429	1.620478
12/2009	11.13158	3.052292	3.65	0.000	5.149194	17.11396
01/2010	14.49521	3.052291	4.75	0.000	8.512831	20.47759
02/2010	10.89715	3.05229	3.57	0.000	4.914774	16.87953
03/2010	-3.095136	3.05229	-1.01	0.311	-9.077514	2.887242
04/2010	-9.618042	3.052289	-3.15	0.002	-15.60042	-3.635665
05/2010	-3.324066	3.052288	-1.09	0.276	-9.306441	2.658308
06/2010	10.91221	3.052287	3.58	0.000	4.929841	16.89459
07/2010	16.63914	3.052286	5.45	0.000	10.65677	22.62151
08/2010	12.89966	3.052286	4.23	0.000	6.917294	18.88203
09/2010	1.158567	3.052285	0.38	0.704	-4.823801	7.140936
10/2010	-9.297072	3.052284	-3.05	0.002	-15.27944	-3.314705
11/2010	-2.228662	3.052283	-0.73	0.465	-8.211028	3.753704
12/2010	13.72268	3.052281	4.50	0.000	7.740317	19.70504
01/2011	14.22493	3.05228	4.66	0.000	8.242569	20.20729
02/2011	1.972608	3.05228	0.65	0.518	-4.009751	7.954967
03/2011	-6.208965	3.052279	-2.03	0.042	-12.19132	-.226607
04/2011	-9.801175	3.052279	-3.21	0.001	-15.78353	-3.818819
05/2011	-2.970979	3.052278	-0.97	0.330	-8.953334	3.011376
06/2011	8.251382	3.052277	2.70	0.007	2.269028	14.23374

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07/2011	15.05179	3.052276	4.93	0.000	9.069437	21.03414
08/2011	11.00737	3.052276	3.61	0.000	5.025023	16.98972
09/2011	-3.53773	3.052275	-1.16	0.246	-9.520079	2.444619
10/2011	-10.13682	3.052274	-3.32	0.001	-16.11917	-4.154473
11/2011	-5.304448	3.052274	-1.74	0.082	-11.2868	.6778992
12/2011	1.088651	3.052274	0.36	0.721	-4.893697	7.070998
01/2012	2.56618	3.052274	0.84	0.400	-3.416166	8.548527
02/2012	-.4115271	3.052273	-0.13	0.893	-6.393873	5.570819
03/2012	-9.293764	3.052273	-3.04	0.002	-15.27611	-3.311419
04/2012	-10.83941	3.052272	-3.55	0.000	-16.82175	-4.857068
05/2012	-5.790665	3.052271	-1.90	0.058	-11.77301	.1916767
06/2012	4.227752	3.05227	1.39	0.166	-1.754588	10.21009
07/2012	12.66149	3.052269	4.15	0.000	6.679154	18.64383
08/2012	6.13941	3.052268	2.01	0.044	.1570739	12.12175
09/2012	-5.064978	3.052267	-1.66	0.097	-11.04731	.9173565
10/2012	-10.21502	3.052267	-3.35	0.001	-16.19735	-4.232688
11/2012	-3.700038	3.052266	-1.21	0.225	-9.68237	2.282293
12/2012	1.193116	3.052264	0.39	0.696	-4.789211	7.175444
01/2013	4.405621	3.052262	1.44	0.149	-1.576703	10.38794
02/2013	5.09963	3.05226	1.67	0.095	-.882689	11.08195
03/2013	-.4906964	3.052257	-0.16	0.872	-6.473011	5.491619
04/2013	-9.723053	3.052255	-3.19	0.001	-15.70536	-3.740742
05/2013	-8.05872	3.052253	-2.64	0.008	-14.04103	-2.076414
06/2013	.551404	3.05225	0.18	0.857	-5.430897	6.533705
07/2013	5.409738	3.052248	1.77	0.076	-.5725577	11.39203
08/2013	2.308546	3.052245	0.76	0.449	-3.673745	8.290836
09/2013	-5.072823	3.052243	-1.66	0.097	-11.05511	.9094641
10/2013	-10.80706	3.052241	-3.54	0.000	-16.78934	-4.824778
11/2013	-2.349596	3.052239	-0.77	0.441	-8.331875	3.632683
12/2013	6.189431	3.052238	2.03	0.043	.2071557	12.17171
01/2014	12.71102	3.052238	4.16	0.000	6.728742	18.6933
02/2014	6.987426	3.052235	2.29	0.022	1.005156	12.9697
03/2014	-2.046078	3.052237	-0.67	0.503	-8.028352	3.936196
04/2014	-10.05183	3.052231	-3.29	0.001	-16.03409	-4.069567
05/2014	-6.329871	3.052232	-2.07	0.038	-12.31214	-.347607
06/2014	3.61481	3.052228	1.18	0.236	-2.367448	9.597068
07/2014	3.793964	3.052227	1.24	0.214	-2.188291	9.776219
08/2014	2.388031	3.052224	0.78	0.434	-3.594219	8.370281
09/2014	-4.630212	3.052221	-1.52	0.129	-10.61246	1.352033
10/2014	-11.21452	3.052222	-3.67	0.000	-17.19677	-5.232276
11/2014	-1.953173	3.052218	-0.64	0.522	-7.935411	4.029064

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01/2015	8.419659	3.05412	2.76	0.006	2.433694	14.40562
02/2015	12.0633	3.053307	3.95	0.000	6.078928	18.04767
03/2015	-2.622299	3.053307	-0.86	0.390	-8.606671	3.362072
04/2015	-10.99208	3.053307	-3.60	0.000	-16.97645	-5.00771
05/2015	-4.858547	3.053307	-1.59	0.112	-10.84292	1.125825
06/2015	6.97091	3.053307	2.28	0.022	.9865374	12.95528
07/2015	10.56639	3.053307	3.46	0.001	4.582019	16.55076
08/2015	6.219886	3.053307	2.04	0.042	.2355132	12.20426
09/2015	-4.476623	3.053307	-1.47	0.143	-10.461	1.507749
10/2015	-11.29456	3.053307	-3.70	0.000	-17.27893	-5.31019
11/2015	-7.138996	3.053307	-2.34	0.019	-13.12337	-1.154623
12/2015	-2.345706	3.053307	-0.77	0.442	-8.330078	3.638667
01/2016	7.305592	3.053004	2.39	0.017	1.321814	13.28937
02/2016	5.167734	3.053005	1.69	0.091	-.8160463	11.15151
03/2016	-7.910725	3.053013	-2.59	0.010	-13.89452	-1.92693
04/2016	-10.89657	3.053025	-3.57	0.000	-16.88039	-4.91275
05/2016	-7.143642	3.053036	-2.34	0.019	-13.12748	-1.1598
06/2016	4.332453	3.05305	1.42	0.156	-1.651414	10.31632
07/2016	12.35783	3.053063	4.05	0.000	6.373932	18.34172
08/2016	10.63225	3.053075	3.48	0.000	4.648337	16.61617
09/2016	1.210586	3.053091	0.40	0.692	-4.773363	7.194534
10/2016	-10.36873	3.053103	-3.40	0.001	-16.3527	-4.384755
11/2016	-6.557732	3.053113	-2.15	0.032	-12.54172	-.5737399
12/2016	2.734994	3.053123	0.90	0.370	-3.249018	8.719005
01/2017	1.080316	3.053131	0.35	0.723	-4.903711	7.064344
02/2017	-5.081815	3.05314	-1.66	0.096	-11.06586	.9022294
03/2017	-7.07275	3.053148	-2.32	0.021	-13.05681	-1.088689
04/2017	-10.3789	3.05316	-3.40	0.001	-16.36298	-4.394817
05/2017	-6.473595	3.05317	-2.12	0.034	-12.4577	-.4894912
06/2017	1.672422	3.053184	0.55	0.584	-4.311709	7.656553
07/2017	8.493432	3.053196	2.78	0.005	2.509278	14.47759
08/2017	3.566817	3.053209	1.17	0.243	-2.417362	9.550996
09/2017	-4.763079	3.053222	-1.56	0.119	-10.74728	1.221127
10/2017	-8.978536	3.053233	-2.94	0.003	-14.96276	-2.99431
11/2017	-4.669028	3.053244	-1.53	0.126	-10.65328	1.315221
12/2017	8.236015	3.053254	2.70	0.007	2.251748	14.22028
01/2018	12.3005	3.053262	4.03	0.000	6.31622	18.28479
02/2018	-1.551407	3.05327	-0.51	0.611	-7.535706	4.432893
03/2018	-4.526992	3.053278	-1.48	0.138	-10.51131	1.457323
04/2018	-10.04692	3.053288	-3.29	0.001	-16.03126	-4.062587
05/2018	-3.988248	3.053299	-1.31	0.191	-9.972604	1.996108

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06/2018	.6335512	3.053467	0.21	0.836	-5.351135	6.618238
i.ym#c.treatment						
01/2015	.0377955	.114059	0.33	0.740	-.1857559	.261347
02/2015	-.833235	.0892735	-9.33	0.000	-1.008208	-.6582621
03/2015	-.7262734	.0892039	-8.14	0.000	-.9011097	-.551437
04/2015	-.5938088	.0891373	-6.66	0.000	-.7685147	-.419103
05/2015	-.306374	.0891457	-3.44	0.001	-.4810964	-.1316517
06/2015	.1450813	.0889965	1.63	0.103	-.0293486	.3195113
07/2015	.3757419	.0889162	4.23	0.000	.2014694	.5500144
08/2015	.0726542	.0888267	0.82	0.413	-.1014431	.2467514
09/2015	-.4029971	.0887425	-4.54	0.000	-.5769292	-.2290651
10/2015	-.682674	.0887454	-7.69	0.000	-.8566118	-.5087363
11/2015	-.6008986	.0887482	-6.77	0.000	-.7748419	-.4269552
12/2015	-.6356207	.0887498	-7.16	0.000	-.8095671	-.4616743
01/2016	-.9710795	.0774821	-12.53	0.000	-1.122942	-.8192174
02/2016	-.8419055	.0775239	-10.86	0.000	-.9938496	-.6899613
03/2016	-.7040577	.077845	-9.04	0.000	-.8566311	-.5514843
04/2016	-.6087804	.0783888	-7.77	0.000	-.7624197	-.4551411
05/2016	-.3715941	.0788764	-4.71	0.000	-.5261889	-.2169992
06/2016	-.0540306	.0794407	-0.68	0.496	-.2097315	.1016704
07/2016	.1053861	.0799999	1.32	0.188	-.0514108	.262183
08/2016	-.1484794	.0805214	-1.84	0.065	-.3062985	.0093396
09/2016	-.2846716	.081177	-3.51	0.000	-.4437757	-.1255676
10/2016	-.53451	.081661	-6.55	0.000	-.6945627	-.3744573
11/2016	-.6804318	.0820996	-8.29	0.000	-.841344	-.5195196
12/2016	-.6992574	.082492	-8.48	0.000	-.8609388	-.537576
01/2017	-.8758714	.0828364	-10.57	0.000	-1.038228	-.7135151
02/2017	-.8394719	.0831888	-10.09	0.000	-1.002519	-.6764248
03/2017	-.8224493	.0835177	-9.85	0.000	-.986141	-.6587576
04/2017	-.5234548	.0839714	-6.23	0.000	-.6880358	-.3588738
05/2017	-.4768314	.0844012	-5.65	0.000	-.6422547	-.3114082
06/2017	-.2849351	.0849403	-3.35	0.001	-.4514151	-.1184552
07/2017	-.2419255	.0854177	-2.83	0.005	-.4093411	-.0745099
08/2017	-.3216228	.0859063	-3.74	0.000	-.4899961	-.1532495
09/2017	-.37507	.0864309	-4.34	0.000	-.5444715	-.2056684
10/2017	-.7246407	.0868411	-8.34	0.000	-.8948461	-.5544353
11/2017	-.9305442	.0872721	-10.66	0.000	-1.101594	-.7594939
12/2017	-.8993463	.0876383	-10.26	0.000	-1.071114	-.7275784
01/2018	-1.502409	.0879592	-17.08	0.000	-1.674806	-1.330012
02/2018	-1.09973	.0882721	-12.46	0.000	-1.27274	-.9267195
03/2018	-1.204989	.0885769	-13.60	0.000	-1.378596	-1.031381

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04/2018	-.8783212	.0889505	-9.87	0.000	-1.052661	-.7039813
05/2018	-.5710127	.0893625	-6.39	0.000	-.7461601	-.3958654
06/2018	-.7933233	.0953859	-8.32	0.000	-.9802761	-.6063704
07/2018	-1.619952	3.283889	-0.49	0.622	-8.056256	4.816353
cons	40.62169	3.05215	13.31	0.000	34.63958	46.60379

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Table F-4: Regression Coefficients for DEC Cohort 4

Number of obs	=	2786506
F(66,2704706)	=	11996.52
Prob>F	=	0.0000
R-squared	=	0.6768
AdjR-squared	=	0.6670
Root MSE	=	13.4629

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
11/2014	-2.129968	.5160509	-4.13	0.000	-3.141409	-1.118526
12/2014	.7995394	.1809991	4.42	0.000	.4447874	1.154291
01/2015	3.89335	.159155	24.46	0.000	3.581412	4.205288
02/2015	5.849923	.1488146	39.31	0.000	5.558252	6.141594
03/2015	-9.51515	.1428783	-66.60	0.000	-9.795186	-9.235113
04/2015	-15.97402	.1391285	-114.81	0.000	-16.24671	-15.70133
05/2015	-9.411435	.1361754	-69.11	0.000	-9.678333	-9.144536
06/2015	1.840266	.1343183	13.70	0.000	1.577007	2.103525
07/2015	5.658733	.1337927	42.29	0.000	5.396504	5.920962
08/2015	2.205322	.1337911	16.48	0.000	1.943097	2.467548
09/2015	-7.724652	.1337896	-57.74	0.000	-7.986875	-7.462429
10/2015	-13.9259	.1337888	-104.09	0.000	-14.18812	-13.66368
11/2015	-9.326421	.1337878	-69.71	0.000	-9.58864	-9.064201
12/2015	-4.45948	.133787	-33.33	0.000	-4.721698	-4.197262
01/2016	5.543039	.1337978	41.43	0.000	5.2808	5.805278
02/2016	3.400328	.1337861	25.42	0.000	3.138111	3.662544
03/2016	-9.983961	.1337864	-74.63	0.000	-10.24618	-9.721744
04/2016	-12.95555	.133787	-96.84	0.000	-13.21777	-12.69333
05/2016	-9.032726	.1337919	-67.51	0.000	-9.294954	-8.770499
07/2016	9.598957	.1560437	61.51	0.000	9.293117	9.904797
08/2016	8.037947	.1566562	51.31	0.000	7.730906	8.344988
09/2016	-.8432209	.157321	-5.36	0.000	-1.151565	-.5348773
10/2016	-12.11847	.1579077	-76.74	0.000	-12.42796	-11.80898
11/2016	-8.161454	.1584371	-51.51	0.000	-8.471985	-7.850923
12/2016	1.069164	.1589149	6.73	0.000	.7576961	1.380631
01/2017	-.5059034	.1593422	-3.17	0.001	-.8182085	-.1935983
02/2017	-6.49126	.1597712	-40.63	0.000	-6.804406	-6.178114
03/2017	-8.551896	.1602284	-53.37	0.000	-8.865938	-8.237854
04/2017	-11.85432	.1608505	-73.70	0.000	-12.16958	-11.53906
05/2017	-7.881329	.1613408	-48.85	0.000	-8.197551	-7.565107
06/2017	.0995906	.1620685	0.61	0.539	-.218058	.4172392

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07/2017	6.745274	.1628356	41.42	0.000	6.426122	7.064426
08/2017	2.178437	.1635059	13.32	0.000	1.857971	2.498903
09/2017	-5.947133	.1640964	-36.24	0.000	-6.268756	-5.62551
10/2017	-10.11436	.1645538	-61.47	0.000	-10.43688	-9.791838
11/2017	-6.043799	.1651138	-36.60	0.000	-6.367416	-5.720181
12/2017	6.906876	.1655694	41.72	0.000	6.582366	7.231386
01/2018	11.01763	.1659428	66.39	0.000	10.69239	11.34287
02/2018	-2.829121	.1663363	-17.01	0.000	-3.155134	-2.503107
03/2018	-6.102164	.1667903	-36.59	0.000	-6.429067	-5.775261
04/2018	-11.26316	.1672252	-67.35	0.000	-11.59092	-10.9354
05/2018	-4.986363	.1679172	-29.70	0.000	-5.315475	-4.657251
i.ym#c.treatment						
07/2016	.1828978	.113821	1.61	0.108	-.0401874	.4059831
08/2016	.0753366	.1150448	0.65	0.513	-.1501472	.3008203
09/2016	.0573918	.1164161	0.49	0.622	-.1707796	.2855632
10/2016	-.0432637	.1175481	-0.37	0.713	-.2736539	.1871265
11/2016	-.2011198	.1185656	-1.70	0.090	-.4335042	.0312646
12/2016	-.3388227	.11946	-2.84	0.005	-.5729601	-.1046853
01/2017	-.4191447	.1202964	-3.48	0.000	-.6549213	-.1833681
02/2017	-.322171	.1211429	-2.66	0.008	-.5596067	-.0847353
03/2017	-.3026794	.1220086	-2.48	0.013	-.5418119	-.0635469
04/2017	-.305068	.1231544	-2.48	0.013	-.5464463	-.0636897
05/2017	-.2628031	.1240657	-2.12	0.034	-.5059675	-.0196386
06/2017	-.2290852	.1254093	-1.83	0.068	-.4748829	.0167126
07/2017	-.1646681	.1268028	-1.30	0.194	-.4131971	.0838609
08/2017	-.1280379	.1280134	-1.00	0.317	-.3789398	.1228639
09/2017	-.1215365	.1290981	-0.94	0.346	-.3745642	.1314913
10/2017	-.2776967	.129931	-2.14	0.033	-.5323568	-.0230365
11/2017	-.5977234	.1309114	-4.57	0.000	-.8543051	-.3411417
12/2017	-.7841506	.1317133	-5.95	0.000	-1.042304	-.5259972
01/2018	-.6980149	.1323786	-5.27	0.000	-.9574723	-.4385574
02/2018	-.6492616	.1330744	-4.88	0.000	-.9100827	-.3884404
03/2018	-.6414613	.1338591	-4.79	0.000	-.9038203	-.3791022
04/2018	-.4786892	.1346351	-3.56	0.000	-.7425691	-.2148092
05/2018	-.3898461	.1357834	-2.87	0.004	-.6559768	-.1237155
06/2018	-.2791806	.1445601	-1.93	0.053	-.5625133	.004152
cons	40.93424	.1251303	327.13	0.000	40.68899	41.17949

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Table F-5: Regression Coefficients for DEC Cohort 5

Number of obs	=	5015283
$F_{(55, 4813508)}$	=	24906.39
Prob>F	=	0.0000
R-squared	=	0.6783
AdjR-squared	=	0.6648
Root MSE	=	13.3705

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
11/2014	-.5435081	.5493008	-0.99	0.322	-1.620118	.5331018
12/2014	2.555639	.1699153	15.04	0.000	2.222611	2.888667
01/2015	5.198331	.1671576	31.10	0.000	4.870708	5.525954
02/2015	7.457801	.164184	45.42	0.000	7.136006	7.779595
03/2015	-8.452811	.1610993	-52.47	0.000	-8.76856	-8.137062
04/2015	-16.87648	.1581985	-106.68	0.000	-17.18654	-16.56642
05/2015	-11.28277	.1552743	-72.66	0.000	-11.5871	-10.97844
06/2015	-.2107536	.1507475	-1.40	0.162	-.5062134	.0847061
07/2015	2.855071	.1288381	22.16	0.000	2.602553	3.107589
08/2015	-2.192529	.1159251	-18.91	0.000	-2.419738	-1.96532
09/2015	-11.72147	.1103524	-106.22	0.000	-11.93775	-11.50518
10/2015	-16.57337	.106735	-155.28	0.000	-16.78257	-16.36417
11/2015	-11.69213	.1046589	-111.72	0.000	-11.89726	-11.487
12/2015	-7.018907	.102948	-68.18	0.000	-7.220681	-6.817132
01/2016	3.029555	.1017131	29.79	0.000	2.830201	3.228909
02/2016	.2910354	.1006586	2.89	0.004	.0937482	.4883227
03/2016	-12.67847	.0996331	-127.25	0.000	-12.87374	-12.48319
04/2016	-15.18306	.0987026	-153.83	0.000	-15.37651	-14.9896
05/2016	-11.15793	.0979399	-113.93	0.000	-11.34989	-10.96597
06/2016	.2973939	.0971935	3.06	0.002	.1068981	.4878897
07/2016	7.903994	.0965266	81.88	0.000	7.714806	8.093183
08/2016	6.071698	.0959907	63.25	0.000	5.883559	6.259836
09/2016	-2.666698	.0956047	-27.89	0.000	-2.85408	-2.479316
10/2016	-13.20457	.0955226	-138.24	0.000	-13.3918	-13.01735
11/2016	-8.784182	.0955225	-91.96	0.000	-8.971403	-8.596961
12/2016	.493144	.0955222	5.16	0.000	.3059239	.6803641
01/2017	-1.243375	.095522	-13.02	0.000	-1.430595	-1.056156
02/2017	-7.227807	.0955222	-75.67	0.000	-7.415027	-7.040587
03/2017	-9.279795	.0955247	-97.15	0.000	-9.46702	-9.09257
04/2017	-12.69417	.0955735	-132.82	0.000	-12.88149	-12.50685
06/2017	-.9581217	.1736778	-5.52	0.000	-1.298524	-.6177193

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07/2017	5.859184	.1751748	33.45	0.000	5.515847	6.20252
08/2017	1.226236	.1766362	6.94	0.000	.8800355	1.572437
09/2017	-6.870248	.1780275	-38.59	0.000	-7.219175	-6.52132
10/2017	-11.16482	.1791494	-62.32	0.000	-11.51594	-10.81369
11/2017	-6.590741	.1181327	-55.79	0.000	-6.822276	-6.359205
12/2017	5.810316	.1184699	49.04	0.000	5.57812	6.042513
01/2018	9.980797	.1187885	84.02	0.000	9.747976	10.21362
02/2018	-3.575404	.1191229	-30.01	0.000	-3.80888	-3.341927
03/2018	-6.785102	.1194497	-56.80	0.000	-7.019219	-6.550985
04/2018	-11.58747	.1198312	-96.70	0.000	-11.82234	-11.35261
05/2018	-4.981079	.1203004	-41.41	0.000	-5.216863	-4.745294
i.ym#c.treatment						
06/2017	-.5173647	.1557323	-3.32	0.001	-.8225946	-.2121349
07/2017	-.6983529	.1575726	-4.43	0.000	-1.00719	-.3895162
08/2017	-.5044947	.1593592	-3.17	0.002	-.8168331	-.1921563
09/2017	-.4812305	.1610643	-2.99	0.003	-.7969108	-.1655502
10/2017	-.2823175	.1624306	-1.74	0.082	-.6006757	.0360408
11/2017	-.4001677	.0892927	-4.48	0.000	-.5751782	-.2251573
12/2017	-.0392246	.0899129	-0.44	0.663	-.2154507	.1370015
01/2018	-.0004226	.0904822	-0.00	0.996	-.1777645	.1769192
02/2018	-.3374415	.091078	-3.70	0.000	-.5159511	-.1589318
03/2018	-.3964715	.0916601	-4.33	0.000	-.5761219	-.216821
04/2018	-.7122844	.092324	-7.72	0.000	-.8932362	-.5313325
05/2018	-1.211497	.0931284	-13.01	0.000	-1.394026	-1.028969
06/2018	-1.349513	.0995255	-13.56	0.000	-1.54458	-1.154447
cons	41.63829	.0909139	458.00	0.000	41.4601	41.81647

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Table F-6: Regression Coefficients for DEC Cohort 6

Number of obs	=	932468
$F_{(79,912163)}$	=	4651.03
Prob>F	=	0.0000
R-squared	=	0.6947
AdjR-squared	=	0.6879
Root MSE	=	14.3218

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2008	5.041887	.1955036	25.79	0.000	4.658706	5.425067
01/2009	8.460343	.1955007	43.28	0.000	8.077168	8.843518
02/2009	4.973629	.1955007	25.44	0.000	4.590455	5.356804
03/2009	-4.451376	.1955007	-22.77	0.000	-4.834551	-4.068201
04/2009	-10.17105	.1955022	-52.03	0.000	-10.55422	-9.787869
05/2009	-4.912101	.1955007	-25.13	0.000	-5.295276	-4.528927
06/2009	8.786893	.1955198	44.94	0.000	8.403681	9.170105
07/2009	12.66884	.1955007	64.80	0.000	12.28567	13.05202
08/2009	10.79143	.1955007	55.20	0.000	10.40826	11.17461
09/2009	-1.687633	.1955007	-8.63	0.000	-2.070807	-1.304458
10/2009	-10.13697	.1955007	-51.85	0.000	-10.52015	-9.753796
11/2009	-5.4866	.1955007	-28.06	0.000	-5.869774	-5.103425
12/2009	12.36428	.1955007	63.24	0.000	11.98111	12.74746
01/2010	17.60885	.1955007	90.07	0.000	17.22567	17.99202
02/2010	12.61609	.1955007	64.53	0.000	12.23291	12.99926
03/2010	-2.469856	.1955007	-12.63	0.000	-2.853031	-2.086681
11/2015	-10.18717	.2210844	-46.08	0.000	-10.62049	-9.753851
12/2015	-4.665506	.2210844	-21.10	0.000	-5.098824	-4.232187
01/2016	5.039164	.2210892	22.79	0.000	4.605837	5.472491
02/2016	2.188841	.2211231	9.90	0.000	1.755447	2.622235
03/2016	-11.4052	.2212496	-51.55	0.000	-11.83884	-10.97155
04/2016	-13.77942	.2214656	-62.22	0.000	-14.21349	-13.34536
05/2016	-7.164986	.2216541	-32.33	0.000	-7.59942	-6.730551
06/2016	7.092381	.2218493	31.97	0.000	6.657564	7.527198
07/2016	15.79796	.2221225	71.12	0.000	15.36261	16.23332
08/2016	12.0507	.2223425	54.20	0.000	11.61492	12.48648
09/2016	1.411673	.2226219	6.34	0.000	.9753416	1.848004
10/2016	-12.57083	.2228677	-56.40	0.000	-13.00764	-12.13401
11/2016	-9.608094	.223026	-43.08	0.000	-10.04522	-9.17097
12/2016	-.5816872	.2232015	-2.61	0.009	-1.019155	-.1442198
01/2017	-2.80344	.2233837	-12.55	0.000	-3.241264	-2.365615

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02/2017	-8.565695	.2235348	-38.32	0.000	-9.003816	-8.127574
03/2017	-10.73747	.2236869	-48.00	0.000	-11.17589	-10.29905
04/2017	-13.73371	.2239498	-61.32	0.000	-14.17265	-13.29478
05/2017	-8.190045	.22421	-36.53	0.000	-8.629489	-7.750601
06/2017	1.173897	.2245572	5.23	0.000	.7337723	1.614021
07/2017	8.841137	.2248349	39.32	0.000	8.400468	9.281806
08/2017	4.531975	.2250696	20.14	0.000	4.090846	4.973104
09/2017	-5.786436	.2253412	-25.68	0.000	-6.228098	-5.344775
10/2017	-11.07195	.2255921	-49.08	0.000	-11.51411	-10.6298
11/2017	-8.484853	.2258159	-37.57	0.000	-8.927445	-8.042262
12/2017	4.745923	.2260237	21.00	0.000	4.302925	5.188922
01/2018	9.844017	.2262811	43.50	0.000	9.400514	10.28752
02/2018	-5.799516	.2265228	-25.60	0.000	-6.243493	-5.355538
03/2018	-9.931726	.2267483	-43.80	0.000	-10.37615	-9.487307
04/2018	-13.96921	.2269819	-61.54	0.000	-14.41409	-13.52433
05/2018	-6.979706	.2272049	-30.72	0.000	-7.42502	-6.534392
i.ym#c.treatment						
11/2015	.08458	.2079576	0.41	0.684	-.3230099	.4921699
12/2015	.1099624	.2079576	0.53	0.597	-.2976275	.5175523
01/2016	-.2175456	.2079633	-1.05	0.296	-.6251467	.1900555
02/2016	-.1796001	.2080442	-0.86	0.388	-.5873598	.2281596
03/2016	-.0315635	.2083977	-0.15	0.880	-.440016	.3768891
04/2016	-.0395616	.2088236	-0.19	0.850	-.4488488	.3697257
05/2016	-.0551549	.2092673	-0.26	0.792	-.4653118	.3550019
06/2016	-.0480782	.2097605	-0.23	0.819	-.4592019	.3630455
07/2016	-.0691823	.2103488	-0.33	0.742	-.4814589	.3430942
08/2016	-.0422501	.2108154	-0.20	0.841	-.4554414	.3709411
09/2016	-.1268783	.2114394	-0.60	0.548	-.5412925	.2875358
10/2016	-.208193	.2118933	-0.98	0.326	-.6234967	.2071108
11/2016	-.4404545	.2123196	-2.07	0.038	-.8565939	-.0243151
12/2016	-.5706292	.2127374	-2.68	0.007	-.9875875	-.153671
01/2017	-.6035371	.2131731	-2.83	0.005	-1.021349	-.185725
02/2017	-.3146924	.2134679	-1.47	0.140	-.7330823	.1036975
03/2017	-.2962436	.2137588	-1.39	0.166	-.7152036	.1227165
04/2017	-.1736185	.2143096	-0.81	0.418	-.5936581	.2464212
05/2017	-.1094373	.2148385	-0.51	0.610	-.5305137	.311639
06/2017	-.2106441	.2155687	-0.98	0.328	-.6331515	.2118633
07/2017	-.3139904	.2161692	-1.45	0.146	-.7376749	.1096941
08/2017	-.4149419	.2166938	-1.91	0.056	-.8396545	.0097707
09/2017	-.4059735	.2172397	-1.87	0.062	-.8317561	.0198091
10/2017	-.351112	.2177589	-1.61	0.107	-.7779122	.0756882

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11/2017	-.5587344	.2182237	-2.56	0.010	-.9864456	-.1310232
12/2017	-.62449	.2186823	-2.86	0.004	-1.0531	-.19588
01/2018	-.8825185	.2191279	-4.03	0.000	-1.312002	-.4530352
02/2018	-.5237236	.2196562	-2.38	0.017	-.9542425	-.0932047
03/2018	-.6866934	.2200998	-3.12	0.002	-1.118082	-.2553052
04/2018	-.4439611	.2206005	-2.01	0.044	-.8763306	-.0115916
05/2018	-.499444	.2210376	-2.26	0.024	-.9326702	-.0662177
06/2018	-.6342094	.2331416	-2.72	0.007	-1.091159	-.1772597
cons	45.58088	.1674973	272.13	0.000	45.25259	45.90917

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Table F-7: Regression Coefficients for DEC Cohort 7

Number of obs	=	8299134
F(108,8180957)	=	22249.73
Prob>F	=	0.0000
R-squared	=	0.7006
AdjR-squared	=	0.6963
Root MSE	=	14.8302

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2008	6.63468	.1067528	62.15	0.000	6.425448	6.843912
01/2009	10.50638	.1067023	98.46	0.000	10.29725	10.71552
02/2009	7.248244	.1066483	67.96	0.000	7.039217	7.457271
03/2009	-1.858576	.1065871	-17.44	0.000	-2.067483	-1.649669
04/2009	-7.724038	.106532	-72.50	0.000	-7.932836	-7.515239
05/2009	-4.904396	.1064595	-46.07	0.000	-5.113053	-4.695739
06/2009	5.135311	.1063953	48.27	0.000	4.926781	5.343842
07/2009	8.90383	.1063155	83.75	0.000	8.695456	9.112205
08/2009	8.088819	.1062409	76.14	0.000	7.880591	8.297047
09/2009	-2.589432	.1061753	-24.39	0.000	-2.797532	-2.381332
10/2009	-7.883209	.1060962	-74.30	0.000	-8.091154	-7.675264
11/2009	-2.734342	.1060323	-25.79	0.000	-2.942161	-2.526522
12/2009	12.9659	.1059685	122.36	0.000	12.7582	13.17359
01/2010	16.56347	.1059189	156.38	0.000	16.35587	16.77106
02/2010	12.76491	.105867	120.57	0.000	12.55741	12.9724
03/2010	-1.560876	.1058037	-14.75	0.000	-1.768248	-1.353505
04/2010	-8.540132	.1057297	-80.77	0.000	-8.747359	-8.332906
05/2010	-2.732645	.1056449	-25.87	0.000	-2.939705	-2.525584
06/2010	10.76693	.1055719	101.99	0.000	10.56001	10.97385
07/2010	16.23684	.1054992	153.90	0.000	16.03006	16.44361
08/2010	12.6379	.1054367	119.86	0.000	12.43124	12.84455
09/2010	1.491803	.1053833	14.16	0.000	1.285256	1.698351
10/2010	-8.168209	.1053197	-77.56	0.000	-8.374632	-7.961786
11/2010	-.5088313	.1052718	-4.83	0.000	-.7151602	-.3025024
12/2010	15.77979	.1052173	149.97	0.000	15.57357	15.98601
01/2011	16.31188	.1051705	155.10	0.000	16.10575	16.51801
02/2011	3.798693	.1051237	36.14	0.000	3.592654	4.004731
03/2011	-4.666683	.105064	-44.42	0.000	-4.872605	-4.460761
04/2011	-8.529953	.1050072	-81.23	0.000	-8.735764	-8.324143
05/2011	-2.30731	.1049513	-21.98	0.000	-2.513011	-2.101609
06/2011	8.407116	.1048911	80.15	0.000	8.201534	8.612699

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07/2011	14.8288	.1048115	141.48	0.000	14.62337	15.03422
08/2011	11.00042	.1047064	105.06	0.000	10.7952	11.20564
09/2011	-2.913439	.1045977	-27.85	0.000	-3.118447	-2.708432
10/2011	-8.915685	.1045466	-85.28	0.000	-9.120592	-8.710777
11/2011	-3.662732	.1045456	-35.03	0.000	-3.867638	-3.457827
12/2011	2.784185	.1045443	26.63	0.000	2.579281	2.989088
01/2012	4.476587	.1045273	42.83	0.000	4.271717	4.681457
02/2012	1.30326	.10448	12.47	0.000	1.098483	1.508037
03/2012	-7.954345	.1044434	-76.16	0.000	-8.15905	-7.74964
04/2012	-9.741258	.1044409	-93.27	0.000	-9.945959	-9.536558
05/2012	-4.950153	.1044409	-47.40	0.000	-5.154854	-4.745453
06/2012	4.580658	.104441	43.86	0.000	4.375958	4.785359
07/2012	12.81242	.1044409	122.68	0.000	12.60772	13.01712
08/2012	6.515639	.104441	62.39	0.000	6.310938	6.720339
11/2015	-6.372445	.1256059	-50.73	0.000	-6.618628	-6.126262
12/2015	-1.447519	.1256059	-11.52	0.000	-1.693702	-1.201336
01/2016	8.053045	.1256142	64.11	0.000	7.806845	8.299244
02/2016	5.993706	.125644	47.70	0.000	5.747449	6.239964
03/2016	-7.376266	.1257824	-58.64	0.000	-7.622795	-7.129737
04/2016	-10.48149	.1259675	-83.21	0.000	-10.72838	-10.2346
05/2016	-6.797012	.1261557	-53.88	0.000	-7.044273	-6.549752
06/2016	4.808092	.1263586	38.05	0.000	4.560434	5.055751
07/2016	12.85767	.1265898	101.57	0.000	12.60956	13.10578
08/2016	10.86405	.126768	85.70	0.000	10.61559	11.11251
09/2016	1.366338	.126994	10.76	0.000	1.117434	1.615242
10/2016	-10.12053	.127172	-79.58	0.000	-10.36978	-9.871275
11/2016	-5.940203	.1273335	-46.65	0.000	-6.189772	-5.690634
12/2016	3.746748	.1275126	29.38	0.000	3.496828	3.996668
01/2017	1.91543	.1276766	15.00	0.000	1.665188	2.165672
02/2017	-4.458172	.1278252	-34.88	0.000	-4.708705	-4.207639
03/2017	-6.570818	.1279588	-51.35	0.000	-6.821613	-6.320024
04/2017	-9.967335	.1281367	-77.79	0.000	-10.21848	-9.716192
05/2017	-6.33538	.1283256	-49.37	0.000	-6.586894	-6.083867
06/2017	1.787446	.1285641	13.90	0.000	1.535465	2.039426
07/2017	8.571358	.1287744	66.56	0.000	8.318965	8.823751
08/2017	3.520584	.1289543	27.30	0.000	3.267838	3.77333
09/2017	-4.741817	.1291531	-36.71	0.000	-4.994952	-4.488681
10/2017	-9.012064	.1293237	-69.69	0.000	-9.265534	-8.758594
11/2017	-4.150784	.1295249	-32.05	0.000	-4.404649	-3.89692
12/2017	9.370016	.129694	72.25	0.000	9.115821	9.624212
01/2018	12.93185	.1298495	99.59	0.000	12.67735	13.18635

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02/2018	-1.087792	.1300131	-8.37	0.000	-1.342613	-.8329714
03/2018	-4.273792	.1301772	-32.83	0.000	-4.528935	-4.018649
04/2018	-9.890106	.1303374	-75.88	0.000	-10.14556	-9.634649
05/2018	-4.150729	.1305172	-31.80	0.000	-4.406538	-3.89492
i.ym#c.treatment						
11/2015	-.0371516	.0982694	-0.38	0.705	-.2297561	.1554529
12/2015	-.1025569	.0982697	-1.04	0.297	-.295162	.0900482
01/2016	-.0952013	.0982833	-0.97	0.333	-.2878331	.0974305
02/2016	-.1078629	.0983325	-1.10	0.273	-.300591	.0848653
03/2016	-.1347891	.0985748	-1.37	0.172	-.3279923	.058414
04/2016	-.1659005	.0989088	-1.68	0.093	-.3597582	.0279572
05/2016	-.181293	.0992522	-1.83	0.068	-.3758239	.0132378
06/2016	-.2988676	.0996305	-3.00	0.003	-.4941399	-.1035953
07/2016	-.3339437	.1000505	-3.34	0.001	-.5300392	-.1378483
08/2016	-.3068337	.1003827	-3.06	0.002	-.5035802	-.1100872
09/2016	-.2748773	.1007907	-2.73	0.006	-.4724236	-.0773311
10/2016	-.1441438	.1011125	-1.43	0.154	-.3423207	.054033
11/2016	-.123375	.1014063	-1.22	0.224	-.3221278	.0753777
12/2016	-.2335462	.1017181	-2.30	0.022	-.4329101	-.0341823
01/2017	-.2909031	.1020073	-2.85	0.004	-.4908337	-.0909724
02/2017	-.2518571	.1022726	-2.46	0.014	-.4523077	-.0514065
03/2017	-.2672344	.1025103	-2.61	0.009	-.4681508	-.0663179
04/2017	-.3105615	.1028324	-3.02	0.003	-.5121093	-.1090138
05/2017	-.3154442	.1031603	-3.06	0.002	-.5176348	-.1132536
06/2017	-.3646096	.1035768	-3.52	0.000	-.5676165	-.1616027
07/2017	-.5011984	.1039479	-4.82	0.000	-.7049326	-.2974642
08/2017	-.4079286	.1042687	-3.91	0.000	-.6122916	-.2035657
09/2017	-.3313687	.1046242	-3.17	0.002	-.5364284	-.126309
10/2017	-.2276498	.1049184	-2.17	0.030	-.4332861	-.0220135
11/2017	-.2772142	.1052634	-2.63	0.008	-.4835266	-.0709018
12/2017	-.4037421	.1055507	-3.83	0.000	-.6106177	-.1968664
01/2018	-.5183084	.1058129	-4.90	0.000	-.7256979	-.3109189
02/2018	-.3762491	.1060947	-3.55	0.000	-.5841909	-.1683073
03/2018	-.3108275	.1063713	-2.92	0.003	-.5193115	-.1023435
04/2018	-.2742283	.1066624	-2.57	0.010	-.4832827	-.0651739
05/2018	-.2879504	.1069818	-2.69	0.007	-.4976308	-.07827
06/2018	-.3500807	.1116893	-3.13	0.002	-.5689878	-.1311737
cons	40.30704	.0950932	423.87	0.000	40.12066	40.49342

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Table F-8: Regression Coefficients for DEC Cohort 8

Number of obs	=	5307646
F(135,5231818)	=	9498.05
Prob>F	=	0.0000
R-squared	=	0.7128
AdjR-squared	=	0.7087
Root MSE	=	14.9134

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2008	4.665554	.1284077	36.33	0.000	4.41388	4.917229
01/2009	7.884682	.1283026	61.45	0.000	7.633213	8.13615
02/2009	4.619858	.1282018	36.04	0.000	4.368587	4.871129
03/2009	-3.759741	.1281051	-29.35	0.000	-4.010823	-3.50866
04/2009	-9.435569	.1279839	-73.72	0.000	-9.686413	-9.184726
05/2009	-5.94497	.1278607	-46.50	0.000	-6.195572	-5.694367
06/2009	4.577267	.1277431	35.83	0.000	4.326895	4.827639
07/2009	8.525671	.1275873	66.82	0.000	8.275604	8.775737
08/2009	7.816227	.1274158	61.34	0.000	7.566497	8.065958
09/2009	-3.59539	.1272721	-28.25	0.000	-3.844838	-3.345941
10/2009	-9.605671	.1271463	-75.55	0.000	-9.854873	-9.356468
11/2009	-4.805069	.1270129	-37.83	0.000	-5.05401	-4.556128
12/2009	10.12117	.1269192	79.74	0.000	9.872409	10.36992
01/2010	14.09355	.1268292	111.12	0.000	13.84497	14.34213
02/2010	10.33827	.1267061	81.59	0.000	10.08993	10.58661
03/2010	-3.474907	.1265927	-27.45	0.000	-3.723024	-3.22679
04/2010	-10.14663	.1264552	-80.24	0.000	-10.39448	-9.898786
05/2010	-3.688045	.126273	-29.21	0.000	-3.935536	-3.440555
06/2010	10.36194	.1261212	82.16	0.000	10.11475	10.60914
07/2010	16.14098	.125978	128.13	0.000	15.89406	16.38789
08/2010	12.15247	.1258577	96.56	0.000	11.90579	12.39914
09/2010	.6684701	.1257539	5.32	0.000	.421997	.9149432
10/2010	-10.00717	.125636	-79.65	0.000	-10.25342	-9.760931
11/2010	-2.711028	.1255112	-21.60	0.000	-2.957026	-2.465031
12/2010	13.08271	.1248498	104.79	0.000	12.83801	13.32741
01/2011	13.41232	.1247462	107.52	0.000	13.16782	13.65682
02/2011	1.505877	.1246218	12.08	0.000	1.261622	1.750131
03/2011	-6.780822	.1245043	-54.46	0.000	-7.024846	-6.536798
04/2011	-10.25104	.1243865	-82.41	0.000	-10.49483	-10.00724
05/2011	-3.707322	.1242591	-29.84	0.000	-3.950865	-3.463779
06/2011	7.670862	.1241328	61.80	0.000	7.427567	7.914158

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07/2011	14.08484	.1239602	113.62	0.000	13.84188	14.3278
08/2011	10.43422	.123824	84.27	0.000	10.19153	10.67691
09/2011	-4.085844	.1236838	-33.03	0.000	-4.32826	-3.843428
10/2011	-10.76552	.1235026	-87.17	0.000	-11.00758	-10.52346
11/2011	-5.747247	.1233199	-46.60	0.000	-5.98895	-5.505545
12/2011	.4708192	.1231544	3.82	0.000	.2294409	.7121975
01/2012	2.229247	.1229934	18.12	0.000	1.988185	2.47031
02/2012	-1.142252	.1227078	-9.31	0.000	-1.382755	-.9017493
03/2012	-10.24984	.1216331	-84.27	0.000	-10.48824	-10.01144
04/2012	-11.85453	.1205722	-98.32	0.000	-12.09084	-11.61821
05/2012	-7.040986	.1194806	-58.93	0.000	-7.275164	-6.806809
06/2012	2.522609	.1180561	21.37	0.000	2.291224	2.753995
07/2012	10.63797	.1164128	91.38	0.000	10.4098	10.86613
08/2012	4.200655	.1159483	36.23	0.000	3.9734	4.427909
09/2012	-6.141831	.1158662	-53.01	0.000	-6.368924	-5.914737
10/2012	-10.94715	.1157883	-94.54	0.000	-11.17409	-10.72021
11/2012	-4.144843	.115706	-35.82	0.000	-4.371622	-3.918063
12/2012	.5006342	.1156251	4.33	0.000	.2740131	.7272553
01/2013	4.159401	.1154921	36.01	0.000	3.933041	4.385761
02/2013	4.623465	.1141373	40.51	0.000	4.399759	4.84717
03/2013	-1.691674	.1119129	-15.12	0.000	-1.911019	-1.472328
04/2013	-10.71707	.1108811	-96.65	0.000	-10.93439	-10.49975
05/2013	-9.385884	.1105303	-84.92	0.000	-9.602519	-9.169249
06/2013	-.8121385	.1104983	-7.35	0.000	-1.028711	-.5955657
07/2013	4.019102	.1104702	36.38	0.000	3.802584	4.235619
08/2013	1.097629	.1104415	9.94	0.000	.8811679	1.314091
09/2013	-5.601978	.1104156	-50.74	0.000	-5.818388	-5.385567
10/2013	-11.1088	.1103913	-100.63	0.000	-11.32516	-10.89244
11/2013	-2.61966	.1103726	-23.73	0.000	-2.835986	-2.403333
12/2013	5.934792	.1103622	53.78	0.000	5.718486	6.151097
01/2014	12.70092	.1103539	115.09	0.000	12.48463	12.91721
02/2014	7.079014	.1103435	64.15	0.000	6.862744	7.295283
03/2014	-1.800152	.110331	-16.32	0.000	-2.016397	-1.583907
04/2014	-10.18771	.1103205	-92.35	0.000	-10.40394	-9.971489
05/2014	-6.75133	.1103119	-61.20	0.000	-6.967538	-6.535123
06/2014	2.93814	.1103014	26.64	0.000	2.721953	3.154327
07/2014	3.363768	.1102713	30.50	0.000	3.14764	3.579896
08/2014	1.527332	.1097456	13.92	0.000	1.312235	1.74243
09/2014	-5.125591	.1092542	-46.91	0.000	-5.339726	-4.911457
10/2014	-11.57056	.1087406	-106.41	0.000	-11.78369	-11.35743
11/2014	-2.212373	.1083036	-20.43	0.000	-2.424644	-2.000102

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11/2015	-7.786029	.1195374	-65.13	0.000	-8.020318	-7.55174
12/2015	-2.99641	.1195383	-25.07	0.000	-3.2307	-2.762119
01/2016	6.667491	.1195434	55.77	0.000	6.43319	6.901792
02/2016	4.529995	.1195698	37.89	0.000	4.295642	4.764348
03/2016	-8.547934	.1197704	-71.37	0.000	-8.78268	-8.313189
04/2016	-11.53369	.1201094	-96.03	0.000	-11.7691	-11.29828
05/2016	-7.779562	.1204119	-64.61	0.000	-8.015565	-7.543559
06/2016	3.698339	.1207616	30.63	0.000	3.46165	3.935027
07/2016	11.72515	.1211075	96.82	0.000	11.48778	11.96251
08/2016	10.00137	.1214333	82.36	0.000	9.763361	10.23937
09/2016	.5802458	.1218473	4.76	0.000	.3414294	.8190622
10/2016	-10.99863	.1221547	-90.04	0.000	-11.23805	-10.75921
11/2016	-7.187041	.1224334	-58.70	0.000	-7.427006	-6.947076
12/2016	2.105999	.1226829	17.17	0.000	1.865545	2.346453
01/2017	.4515227	.1229016	3.67	0.000	.2106399	.6924054
02/2017	-5.710318	.1231276	-46.38	0.000	-5.951644	-5.468993
03/2017	-7.701129	.1233379	-62.44	0.000	-7.942867	-7.459391
04/2017	-11.00663	.1236309	-89.03	0.000	-11.24894	-10.76432
05/2017	-7.101803	.1239091	-57.31	0.000	-7.344661	-6.858946
06/2017	1.044401	.1242602	8.40	0.000	.8008555	1.287947
07/2017	7.866372	.1245683	63.15	0.000	7.622222	8.110521
08/2017	2.939208	.1248888	23.53	0.000	2.69443	3.183985
09/2017	-5.390468	.1252344	-43.04	0.000	-5.635923	-5.145013
10/2017	-9.605647	.1255052	-76.54	0.000	-9.851633	-9.359661
11/2017	-5.296113	.1257904	-42.10	0.000	-5.542657	-5.049568
12/2017	7.608321	.1260331	60.37	0.000	7.361301	7.855342
01/2018	11.67184	.1262456	92.45	0.000	11.4244	11.91927
02/2018	-2.180505	.1264529	-17.24	0.000	-2.428348	-1.932662
03/2018	-5.155833	.1266551	-40.71	0.000	-5.404072	-4.907593
04/2018	-10.67642	.1269045	-84.13	0.000	-10.92515	-10.42769
05/2018	-4.617779	.1271795	-36.31	0.000	-4.867046	-4.368512
i.ym#c.treatment						
11/2015	-.104931	.110377	-0.95	0.342	-.321266	.1114041
12/2015	-.0904764	.110382	-0.82	0.412	-.3068212	.1258684
01/2016	-.240037	.1103935	-2.17	0.030	-.4564043	-.0236696
02/2016	-.365843	.1104566	-3.31	0.001	-.582334	-.1493521
03/2016	-.2549059	.1109388	-2.30	0.022	-.472342	-.0374698
04/2016	-.2275735	.1117059	-2.04	0.042	-.4465131	-.0086339
05/2016	-.2434956	.1124013	-2.17	0.030	-.4637981	-.0231931
06/2016	-.2538641	.1132241	-2.24	0.025	-.4757794	-.0319488
07/2016	-.1666165	.1140145	-1.46	0.144	-.3900809	.056848

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08/2016	-.1863185	.1147453	-1.62	0.104	-.4112152	.0385783
09/2016	-.205087	.1156041	-1.77	0.076	-.4316669	.021493
10/2016	-.2845099	.1162077	-2.45	0.014	-.5122729	-.0567469
11/2016	-.2214904	.1167966	-1.90	0.058	-.4504076	.0074269
12/2016	-.2502649	.1173095	-2.13	0.033	-.4801873	-.0203425
01/2017	-.3032699	.1177743	-2.58	0.010	-.5341034	-.0724364
02/2017	-.3129059	.1182413	-2.65	0.008	-.5446545	-.0811573
03/2017	-.3410571	.1186914	-2.87	0.004	-.573688	-.1084262
04/2017	-.3438212	.1192805	-2.88	0.004	-.5776067	-.1100358
05/2017	-.3832894	.1198336	-3.20	0.001	-.618159	-.1484199
06/2017	-.3325817	.1205142	-2.76	0.006	-.5687853	-.096378
07/2017	-.2901547	.1211789	-2.39	0.017	-.5276611	-.0526483
08/2017	-.4532241	.1218012	-3.72	0.000	-.6919501	-.214498
09/2017	-.5107921	.1224879	-4.17	0.000	-.750864	-.2707202
10/2017	-.5119521	.1230486	-4.16	0.000	-.7531229	-.2707812
11/2017	-.4492225	.1236348	-3.63	0.000	-.6915423	-.2069026
12/2017	-.6012704	.1240946	-4.85	0.000	-.8444913	-.3580494
01/2018	-.7673052	.124539	-6.16	0.000	-1.011397	-.5232132
02/2018	-.5773163	.1249784	-4.62	0.000	-.8222695	-.332363
03/2018	-.5391807	.1253574	-4.30	0.000	-.7848768	-.2934845
04/2018	-.4942607	.1258908	-3.93	0.000	-.7410022	-.2475191
05/2018	-.6235547	.126472	-4.93	0.000	-.8714354	-.375674
06/2018	-.6160671	.1352241	-4.56	0.000	-.8811016	-.3510327
cons	40.88909	.093722	436.28	0.000	40.7054	41.07278

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Table F-9: Regression Coefficients for DEP Cohort 1

Number of obs	=	33350747
F(95,32692933)	=	116722.9
Prob>F	=	0.0000
R-squared	=	0.7049
AdjR-squared	=	0.6990
Root MSE	=	14.7490

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2013	12.2834	.0643833	190.79	0.000	12.15721	12.40959
01/2014	16.09035	.0642157	250.57	0.000	15.96449	16.21621
02/2014	11.61602	.0641994	180.94	0.000	11.49019	11.74184
03/2014	.194614	.0641805	3.03	0.002	.0688227	.3204054
04/2014	-9.439009	.0641602	-147.12	0.000	-9.56476	-9.313257
05/2014	-7.483544	.0641366	-116.68	0.000	-7.60925	-7.357838
06/2014	3.605807	.0641143	56.24	0.000	3.480145	3.731469
07/2014	3.776511	.0640892	58.93	0.000	3.650899	3.902124
08/2014	.7913161	.0640772	12.35	0.000	.6657271	.9169051
09/2014	-4.432772	.0640772	-69.18	0.000	-4.558361	-4.307183
10/2014	-10.87639	.0640773	-169.74	0.000	-11.00198	-10.7508
11/2014	-.953653	.0640774	-14.88	0.000	-1.079242	-.8280636
01/2015	12.46407	.0808453	154.17	0.000	12.30562	12.62252
02/2015	15.36702	.0808455	190.08	0.000	15.20857	15.52547
03/2015	-7.267612	.0808463	-89.89	0.000	-7.426068	-7.109157
04/2015	-13.06598	.0808473	-161.61	0.000	-13.22444	-12.90752
05/2015	-7.276841	.0808513	-90.00	0.000	-7.435307	-7.118376
06/2015	6.42289	.0808513	79.44	0.000	6.264424	6.581356
07/2015	9.933711	.0808515	122.86	0.000	9.775245	10.09218
08/2015	4.242141	.0808502	52.47	0.000	4.083677	4.400605
09/2015	-5.783397	.0808505	-71.53	0.000	-5.941861	-5.624933
10/2015	-13.42975	.0808515	-166.10	0.000	-13.58821	-13.27128
11/2015	-9.268152	.080852	-114.63	0.000	-9.426619	-9.109685
12/2015	-2.697141	.0808502	-33.36	0.000	-2.855605	-2.538678
01/2016	8.638449	.0808523	106.84	0.000	8.479981	8.796916
02/2016	5.955176	.0808522	73.66	0.000	5.796709	6.113644
03/2016	-8.873138	.080874	-109.72	0.000	-9.031648	-8.714628
04/2016	-13.3391	.0808945	-164.89	0.000	-13.49765	-13.18055
05/2016	-9.483721	.0809217	-117.20	0.000	-9.642325	-9.325117
06/2016	2.159006	.081034	26.64	0.000	2.000182	2.31783
07/2016	11.7407	.0811849	144.62	0.000	11.58158	11.89982

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08/2016	10.27816	.0813185	126.39	0.000	10.11877	10.43754
09/2016	-2.21304	.0814679	-27.16	0.000	-2.372714	-2.053366
10/2016	-13.0337	.081593	-159.74	0.000	-13.19362	-12.87378
11/2016	-7.00772	.0817209	-85.75	0.000	-7.16789	-6.84755
12/2016	3.412713	.0818273	41.71	0.000	3.252335	3.573092
01/2017	1.293354	.0819326	15.79	0.000	1.132769	1.453939
02/2017	-5.060346	.0820269	-61.69	0.000	-5.221116	-4.899576
03/2017	-7.398162	.0821172	-90.09	0.000	-7.559108	-7.237215
04/2017	-10.65626	.0822438	-129.57	0.000	-10.81745	-10.49506
05/2017	-6.130672	.0823515	-74.45	0.000	-6.292078	-5.969266
06/2017	1.350413	.0824829	16.37	0.000	1.188749	1.512076
07/2017	8.146761	.0826304	98.59	0.000	7.984809	8.308714
08/2017	2.655059	.0827752	32.08	0.000	2.492823	2.817296
09/2017	-5.745961	.0829125	-69.30	0.000	-5.908467	-5.583456
10/2017	-10.83542	.0830296	-130.50	0.000	-10.99816	-10.67269
11/2017	-5.806494	.0831559	-69.83	0.000	-5.969476	-5.643511
12/2017	11.02851	.0832607	132.46	0.000	10.86532	11.1917
01/2018	15.14194	.0833635	181.64	0.000	14.97855	15.30533
02/2018	-2.588517	.0834621	-31.01	0.000	-2.7521	-2.424934
03/2018	-5.478516	.0835579	-65.57	0.000	-5.642286	-5.314745
04/2018	-11.58877	.0836662	-138.51	0.000	-11.75275	-11.42478
05/2018	-6.145086	.0837831	-73.35	0.000	-6.309298	-5.980874
i.ym#c.treatment						
01/2015	-.4817097	.0607594	-7.93	0.000	-.600796	-.3626235
02/2015	-.436845	.0606836	-7.20	0.000	-.5557827	-.3179072
03/2015	-.1174143	.0606575	-1.94	0.053	-.2363008	.0014722
04/2015	-.0673995	.0606275	-1.11	0.266	-.1862273	.0514283
05/2015	-.1747214	.0606331	-2.88	0.004	-.29356	-.0558828
06/2015	-.4916212	.0605496	-8.12	0.000	-.6102963	-.3729461
07/2015	-1.060098	.0604023	-17.55	0.000	-1.178484	-.9417117
08/2015	-.0259156	.0603607	-0.43	0.668	-.1442204	.0923892
09/2015	.5182035	.0603221	8.59	0.000	.3999744	.6364326
10/2015	-.5007566	.0603235	-8.30	0.000	-.6189885	-.3825246
11/2015	-.5913001	.0603244	-9.80	0.000	-.7095337	-.4730665
12/2015	-.8549834	.0603219	-14.17	0.000	-.9732122	-.7367546
01/2016	-.9830312	.0603248	-16.30	0.000	-1.101266	-.8647967
02/2016	-1.071648	.0603251	-17.76	0.000	-1.189883	-.9534131
03/2016	-.6991122	.0603606	-11.58	0.000	-.8174168	-.5808076
04/2016	-.5303321	.060395	-8.78	0.000	-.6487041	-.41196
05/2016	-.6681653	.0604398	-11.06	0.000	-.7866251	-.5497055
06/2016	-.9008946	.0606266	-14.86	0.000	-1.019721	-.7820686

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07/2016	.3912485	.0608749	6.43	0.000	.2719359	.510561
08/2016	.6585321	.0610927	10.78	0.000	.5387926	.7782715
09/2016	-.5908955	.0613353	-9.63	0.000	-.7111105	-.4706806
10/2016	-.4819024	.0615381	-7.83	0.000	-.6025148	-.36129
11/2016	-.8080836	.0617412	-13.09	0.000	-.9290941	-.6870732
12/2016	-.9301903	.0619118	-15.02	0.000	-1.051535	-.8088453
01/2017	-.7288759	.0620791	-11.74	0.000	-.8505488	-.607203
02/2017	-.6644125	.0622298	-10.68	0.000	-.7863807	-.5424443
03/2017	-.5728819	.0623733	-9.18	0.000	-.6951314	-.4506325
04/2017	-.6203572	.0625727	-9.91	0.000	-.7429974	-.497717
05/2017	-.747571	.0627427	-11.91	0.000	-.8705444	-.6245977
06/2017	-.734003	.0629484	-11.66	0.000	-.8573796	-.6106264
07/2017	-.6906028	.0631787	-10.93	0.000	-.8144309	-.5667748
08/2017	-.7995024	.0634028	-12.61	0.000	-.9237696	-.6752353
09/2017	-.0924717	.0636168	-1.45	0.146	-.2171584	.032215
10/2017	.3488348	.063798	5.47	0.000	.2237929	.4738767
11/2017	-.8007647	.0639923	-12.51	0.000	-.9261874	-.6753421
12/2017	-1.339632	.0641537	-20.88	0.000	-1.46537	-1.213893
01/2018	-1.25309	.0643109	-19.48	0.000	-1.379137	-1.127043
02/2018	-.8744615	.0644618	-13.57	0.000	-1.000804	-.7481186
03/2018	-.6129992	.0646076	-9.49	0.000	-.7396277	-.4863707
04/2018	-.6321574	.0647741	-9.76	0.000	-.7591122	-.5052025
05/2018	-.6934061	.0649537	-10.68	0.000	-.8207129	-.5660992
06/2018	-.9752954	.0654621	-14.90	0.000	-1.103599	-.846992
cons	44.96266	.0614262	731.98	0.000	44.84226	45.08305

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Table F-10: Regression Coefficients for DEP Cohort 2

Number of obs	=	1324363
F(83,1291654)	=	5018.47
Prob>F	=	0.0000
R-squared	=	0.6873
AdjR-squared	=	0.6793
Root MSE	=	14.3698

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2013	10.59739	.2911435	36.40	0.000	10.02676	11.16802
01/2014	18.6943	.284998	65.59	0.000	18.13571	19.25288
02/2014	14.98298	.282832	52.97	0.000	14.42864	15.53732
03/2014	.0714642	.2802071	0.26	0.799	-.4777321	.6206605
04/2014	-9.570875	.2778032	-34.45	0.000	-10.11536	-9.02639
05/2014	-10.6451	.2752273	-38.68	0.000	-11.18453	-10.10566
06/2014	3.708345	.2729562	13.59	0.000	3.17336	4.24333
07/2014	4.282465	.2704597	15.83	0.000	3.752373	4.812557
08/2014	-3.142081	.2451161	-12.82	0.000	-3.6225	-2.661662
09/2014	-9.089674	.2293094	-39.64	0.000	-9.539113	-8.640236
10/2014	-12.47666	.2211061	-56.43	0.000	-12.91002	-12.0433
11/2014	-3.60765	.2168758	-16.63	0.000	-4.032719	-3.182581
12/2014	4.460534	.2154846	20.70	0.000	4.038191	4.882876
01/2015	10.01601	.215483	46.48	0.000	9.593666	10.43834
02/2015	12.8998	.2154815	59.87	0.000	12.47747	13.32214
03/2015	-8.531963	.215477	-39.60	0.000	-8.954291	-8.109636
04/2015	-14.4935	.2154747	-67.26	0.000	-14.91582	-14.07118
05/2015	-9.523378	.2154734	-44.20	0.000	-9.945698	-9.101057
06/2015	2.650262	.21547	12.30	0.000	2.227948	3.072576
07/2015	5.867211	.2154669	27.23	0.000	5.444903	6.289519
08/2015	1.184402	.2154642	5.50	0.000	.7620995	1.606705
09/2015	-7.280168	.2154631	-33.79	0.000	-7.702468	-6.857867
10/2015	-13.87055	.2154625	-64.38	0.000	-14.29285	-13.44825
11/2015	-9.83021	.2154619	-45.62	0.000	-10.25251	-9.407912
01/2016	7.759313	.2538258	30.57	0.000	7.261823	8.256803
02/2016	5.457167	.2538377	21.50	0.000	4.959654	5.954681
03/2016	-9.121958	.2540502	-35.91	0.000	-9.619888	-8.624028
04/2016	-13.48322	.2542302	-53.04	0.000	-13.9815	-12.98494
05/2016	-10.04955	.2545241	-39.48	0.000	-10.54841	-9.550696
06/2016	.5504089	.2554268	2.15	0.031	.0497812	1.051037
07/2016	9.391358	.2564471	36.62	0.000	8.88873	9.893986

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08/2016	8.828805	.2573584	34.31	0.000	8.324392	9.333219
09/2016	-2.198706	.2586277	-8.50	0.000	-2.705608	-1.691805
10/2016	-12.65787	.2597651	-48.73	0.000	-13.167	-12.14874
11/2016	-7.470831	.2608013	-28.65	0.000	-7.981993	-6.959669
12/2016	2.649381	.2619808	10.11	0.000	2.135907	3.162854
01/2017	.8161692	.2626015	3.11	0.002	.3014793	1.330859
02/2017	-5.108788	.2633038	-19.40	0.000	-5.624854	-4.592721
03/2017	-7.10749	.2639027	-26.93	0.000	-7.62473	-6.590249
04/2017	-10.36758	.2649704	-39.13	0.000	-10.88691	-9.848242
05/2017	-6.229106	.265656	-23.45	0.000	-6.749783	-5.708429
06/2017	.6069767	.2664214	2.28	0.023	.0847999	1.129153
07/2017	7.115578	.267587	26.59	0.000	6.591117	7.640039
08/2017	2.278062	.2686861	8.48	0.000	1.751447	2.804678
09/2017	-5.002681	.2696091	-18.56	0.000	-5.531106	-4.474257
10/2017	-9.639181	.2704857	-35.64	0.000	-10.16932	-9.109038
11/2017	-5.715277	.2715362	-21.05	0.000	-6.247478	-5.183075
12/2017	10.73481	.2722424	39.43	0.000	10.20122	11.2684
01/2018	15.18117	.2728966	55.63	0.000	14.6463	15.71604
02/2018	-2.281692	.2734719	-8.34	0.000	-2.817688	-1.745696
03/2018	-4.950265	.274138	-18.06	0.000	-5.487566	-4.412964
04/2018	-10.96508	.2748404	-39.90	0.000	-11.50376	-10.4264
05/2018	-5.712968	.2756631	-20.72	0.000	-6.253259	-5.172678
i.ym#c.treatment						
01/2016	-.2940158	.1902775	-1.55	0.122	-.6669533	.0789217
02/2016	-.3127838	.1902194	-1.64	0.100	-.6856073	.0600396
03/2016	.140052	.1906249	0.73	0.463	-.2335662	.5136702
04/2016	.1417772	.1909861	0.74	0.458	-.2325491	.5161035
05/2016	-.0330458	.1915494	-0.17	0.863	-.4084761	.3423844
06/2016	-.372274	.1932973	-1.93	0.054	-.75113	.0065821
07/2016	-.4670928	.1953296	-2.39	0.017	-.8499321	-.0842535
08/2016	-.3679604	.1971357	-1.87	0.062	-.7543396	.0184187
09/2016	-.0095294	.1995383	-0.05	0.962	-.4006176	.3815588
10/2016	.0961081	.2016543	0.48	0.634	-.2991274	.4913436
11/2016	.0530629	.2035533	0.26	0.794	-.3458947	.4520205
12/2016	-.1555799	.2055601	-0.76	0.449	-.5584707	.2473108
01/2017	.06298	.2067812	0.30	0.761	-.342304	.4682641
02/2017	.0083661	.2080313	0.04	0.968	-.3993681	.4161003
03/2017	-.034834	.2091218	-0.17	0.868	-.4447055	.3750376
04/2017	-.0862931	.2109464	-0.41	0.682	-.4997408	.3271546
05/2017	-.2581741	.2121577	-1.22	0.224	-.6739959	.1576478
06/2017	-.1880658	.2136218	-0.88	0.379	-.6067572	.2306255

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07/2017	-.3441835	.2155689	-1.60	0.110	-.7666912	.0783241
08/2017	-.3619368	.217431	-1.66	0.096	-.7880942	.0642205
09/2017	-.3588089	.2190726	-1.64	0.101	-.7881838	.0705659
10/2017	-.1918852	.2205187	-0.87	0.384	-.6240943	.240324
11/2017	-.2994767	.2222814	-1.35	0.178	-.7351407	.1361874
12/2017	-.6200525	.2235098	-2.77	0.006	-1.058124	-.181981
01/2018	-.8011186	.2246129	-3.57	0.000	-1.241352	-.360885
02/2018	-.2764544	.2256365	-1.23	0.220	-.7186943	.1657855
03/2018	-.1774399	.2267308	-0.78	0.434	-.6218245	.2669448
04/2018	-.0360123	.2279476	-0.16	0.874	-.4827819	.4107573
05/2018	-.2245772	.2293994	-0.98	0.328	-.6741923	.2250378
06/2018	-.5141316	.2321059	-2.22	0.027	-.9690513	-.0592119
cons	42.70114	.2000864	213.41	0.000	42.30898	43.0933

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Table F-11: Regression Coefficients for DEP Cohort 3

Number of obs	=	1870493
F(77,1816295)	=	7279.54
Prob>F	=	0.0000
R-squared	=	0.6797
AdjR-squared	=	0.6701
Root MSE	=	14.2891

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2013	10.82818	.2712209	39.92	0.000	10.2966	11.35977
01/2014	18.34483	.2662765	68.89	0.000	17.82293	18.86672
02/2014	11.2674	.2652203	42.48	0.000	10.74758	11.78722
03/2014	1.056151	.2635461	4.01	0.000	.5396102	1.572692
04/2014	-6.794034	.2621178	-25.92	0.000	-7.307776	-6.280292
05/2014	-13.44633	.2607022	-51.58	0.000	-13.95729	-12.93536
06/2014	5.899975	.2591258	22.77	0.000	5.392098	6.407853
07/2014	4.434636	.2570903	17.25	0.000	3.930748	4.938524
08/2014	-5.645866	.2546092	-22.17	0.000	-6.144891	-5.146841
09/2014	-8.477301	.252634	-33.56	0.000	-8.972454	-7.982147
10/2014	-13.62876	.2503069	-54.45	0.000	-14.11935	-13.13817
11/2014	1.833326	.2473004	7.41	0.000	1.348626	2.318026
12/2014	7.201564	.2141278	33.63	0.000	6.781881	7.621247
01/2015	8.699186	.1891209	46.00	0.000	8.328515	9.069856
02/2015	11.62882	.1760723	66.05	0.000	11.28373	11.97392
03/2015	-10.73633	.1675336	-64.08	0.000	-11.0647	-10.40797
04/2015	-17.14845	.1621513	-105.76	0.000	-17.46626	-16.83064
05/2015	-10.3839	.1579611	-65.74	0.000	-10.6935	-10.0743
06/2015	1.264688	.1549842	8.16	0.000	.9609247	1.568452
07/2015	3.672569	.1536792	23.90	0.000	3.371363	3.973775
08/2015	-.4947735	.1536774	-3.22	0.001	-.7959758	-.1935712
09/2015	-8.55043	.1536764	-55.64	0.000	-8.851631	-8.24923
10/2015	-14.85945	.1536758	-96.69	0.000	-15.16065	-14.55825
11/2015	-10.77076	.153676	-70.09	0.000	-11.07196	-10.46956
12/2015	-4.687162	.1536744	-30.50	0.000	-4.988359	-4.385966
01/2016	6.938365	.1536736	45.15	0.000	6.63717	7.23956
02/2016	4.435331	.1536731	28.86	0.000	4.134137	4.736525
03/2016	-9.808236	.1536719	-63.83	0.000	-10.10943	-9.507044
04/2016	-14.08789	.1536704	-91.68	0.000	-14.38908	-13.7867
05/2016	-10.66267	.1536698	-69.39	0.000	-10.96386	-10.36148
07/2016	9.336595	.1778265	52.50	0.000	8.988062	9.685129

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08/2016	8.777054	.178728	49.11	0.000	8.426754	9.127355
09/2016	-3.221495	.1797014	-17.93	0.000	-3.573704	-2.869287
10/2016	-12.94114	.1804582	-71.71	0.000	-13.29483	-12.58745
11/2016	-7.751709	.1810579	-42.81	0.000	-8.106576	-7.396842
12/2016	2.048704	.1816174	11.28	0.000	1.692741	2.404668
01/2017	.3949252	.1823009	2.17	0.030	.0376217	.7522286
02/2017	-5.390989	.182895	-29.48	0.000	-5.749457	-5.032521
03/2017	-7.458004	.1835123	-40.64	0.000	-7.817681	-7.098326
04/2017	-10.65468	.1842414	-57.83	0.000	-11.01579	-10.29358
05/2017	-6.517875	.1849133	-35.25	0.000	-6.880298	-6.155451
06/2017	.4418084	.1857929	2.38	0.017	.0776607	.805956
07/2017	6.906229	.1868015	36.97	0.000	6.540104	7.272353
08/2017	1.924281	.1877588	10.25	0.000	1.55628	2.292282
09/2017	-5.264901	.1886116	-27.91	0.000	-5.634574	-4.895229
10/2017	-9.717548	.1892761	-51.34	0.000	-10.08852	-9.346573
11/2017	-6.194776	.1900108	-32.60	0.000	-6.567191	-5.822362
12/2017	9.584095	.1906094	50.28	0.000	9.210507	9.957683
01/2018	14.15336	.191097	74.06	0.000	13.77882	14.52791
02/2018	-2.432517	.1916147	-12.69	0.000	-2.808076	-2.056959
03/2018	-5.172238	.1921078	-26.92	0.000	-5.548763	-4.795714
04/2018	-11.03074	.1928141	-57.21	0.000	-11.40865	-10.65283
05/2018	-5.66916	.1936228	-29.28	0.000	-6.048654	-5.289666
i.ym#c.treatment						
07/2016	-.2364876	.1381473	-1.71	0.087	-.5072516	.0342764
08/2016	-.3991652	.1399745	-2.85	0.004	-.6735103	-.1248201
09/2016	-.3619444	.1419405	-2.55	0.011	-.6401429	-.0837459
10/2016	-.2975852	.1434501	-2.07	0.038	-.5787425	-.0164279
11/2016	-.0660174	.1446492	-0.46	0.648	-.3495248	.21749
12/2016	.0485513	.1457605	0.33	0.739	-.2371342	.3342368
01/2017	.0044539	.1470077	0.03	0.976	-.2836761	.2925838
02/2017	-.2270715	.14815	-1.53	0.125	-.5174404	.0632974
03/2017	-.2801664	.1493279	-1.88	0.061	-.5728438	.012511
04/2017	-.3360605	.1507459	-2.23	0.026	-.6315172	-.0406038
05/2017	-.3775782	.1520177	-2.48	0.013	-.6755276	-.0796289
06/2017	-.5042509	.153686	-3.28	0.001	-.8054702	-.2030316
07/2017	-.6311936	.1555855	-4.06	0.000	-.9361358	-.3262514
08/2017	-.5327004	.1573394	-3.39	0.001	-.8410802	-.2243207
09/2017	-.5532146	.1589	-3.48	0.000	-.8646531	-.2417761
10/2017	-.5722229	.1600786	-3.57	0.000	-.8859713	-.2584744
11/2017	-.3548008	.1613668	-2.20	0.028	-.6710741	-.0385276
12/2017	-.0669128	.1624294	-0.41	0.680	-.3852689	.2514432

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01/2018	-.070757	.1633214	-0.43	0.665	-.3908613	.2493473
02/2018	-.5025356	.1642171	-3.06	0.002	-.8243954	-.1806758
03/2018	-.4768844	.1651377	-2.89	0.004	-.8005486	-.1532202
04/2018	-.6556493	.1663534	-3.94	0.000	-.9816961	-.3296024
05/2018	-.7246817	.1677257	-4.32	0.000	-1.053418	-.3959451
06/2018	-.7034253	.1699905	-4.14	0.000	-1.036601	-.3702498
cons	43.09341	.1406951	306.29	0.000	42.81765	43.36917

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Table F-12: Regression Coefficients for DEP Cohort 4

Number of obs	=	3127601
F(53,3025223)	=	18311.52
Prob>F	=	0.0000
R-squared	=	0.6566
AdjR-squared	=	0.6450
Root MSE	=	16.0197

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
01/2015	42.0015	.3640951	115.36	0.000	41.28789	42.71511
02/2015	25.7931	.2910192	88.63	0.000	25.22271	26.36349
03/2015	.0888886	.2507836	0.35	0.723	-.4026383	.5804156
04/2015	-14.44873	.2431523	-59.42	0.000	-14.9253	-13.97216
05/2015	10.60925	.2426207	43.73	0.000	10.13372	11.08477
06/2015	19.84851	.2420862	81.99	0.000	19.37403	20.32299
07/2015	8.1361	.2393017	34.00	0.000	7.667077	8.605123
08/2015	9.29721	.2359954	39.40	0.000	8.834668	9.759753
09/2015	3.484304	.2338265	14.90	0.000	3.026012	3.942596
10/2015	-13.16111	.2321962	-56.68	0.000	-13.61621	-12.70602
11/2015	-9.894599	.2312317	-42.79	0.000	-10.34781	-9.441393
12/2015	-4.300453	.230293	-18.67	0.000	-4.751819	-3.849087
01/2016	8.334057	.2296242	36.29	0.000	7.884001	8.784112
02/2016	4.889433	.2290246	21.35	0.000	4.440553	5.338313
03/2016	-9.80188	.2283662	-42.92	0.000	-10.24947	-9.35429
04/2016	-13.17324	.2278224	-57.82	0.000	-13.61976	-12.72671
05/2016	-9.909555	.2276834	-43.52	0.000	-10.35581	-9.463304
06/2016	1.198147	.2276833	5.26	0.000	.751896	1.644399
07/2016	17.49121	.2276832	76.82	0.000	17.04496	17.93747
08/2016	17.71617	.2276828	77.81	0.000	17.26992	18.16242
09/2016	-.5585539	.2276826	-2.45	0.014	-1.004804	-.1123039
10/2016	-11.81609	.2276824	-51.90	0.000	-12.26234	-11.36984
11/2016	-6.418996	.2276823	-28.19	0.000	-6.865245	-5.972746
12/2016	4.27747	.2276823	18.79	0.000	3.83122	4.723719
01/2017	2.675342	.2276823	11.75	0.000	2.229093	3.121591
02/2017	-3.752356	.227682	-16.48	0.000	-4.198605	-3.306107
03/2017	-5.521757	.2276941	-24.25	0.000	-5.96803	-5.075485
04/2017	-9.230526	.2278002	-40.52	0.000	-9.677007	-8.784046
06/2017	1.854392	.2929733	6.33	0.000	1.280175	2.42861
07/2017	8.380718	.2942959	28.48	0.000	7.803908	8.957527
08/2017	3.328861	.2957553	11.26	0.000	2.749191	3.908531

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09/2017	-.3274947	.2971527	-1.10	0.270	-.9099035	.2549142
10/2017	-3.762946	.2981534	-12.62	0.000	-4.347316	-3.178576
11/2017	-4.289536	.2992498	-14.33	0.000	-4.876055	-3.703017
12/2017	11.58691	.3003237	38.58	0.000	10.99829	12.17553
01/2018	16.63571	.301101	55.25	0.000	16.04556	17.22586
02/2018	-1.299607	.3019557	-4.30	0.000	-1.891429	-.707784
03/2018	-3.266138	.3028899	-10.78	0.000	-3.859791	-2.672484
04/2018	-10.0344	.3040123	-33.01	0.000	-10.63025	-9.438546
05/2018	-4.759072	.3050362	-15.60	0.000	-5.356933	-4.161212
i.ym#c.treatment						
06/2017	-.2840964	.2083152	-1.36	0.173	-.6923868	.1241941
07/2017	-.1798442	.2105184	-0.85	0.393	-.5924529	.2327645
08/2017	-.1314894	.2128982	-0.62	0.537	-.5487623	.2857835
09/2017	-.1687879	.2151689	-0.78	0.433	-.5905113	.2529356
10/2017	-.0873951	.2167886	-0.40	0.687	-.5122931	.337503
11/2017	-.283198	.2185507	-1.30	0.195	-.7115497	.1451537
12/2017	-.4871267	.2202422	-2.21	0.027	-.9187937	-.0554597
01/2018	-.4412774	.2214845	-1.99	0.046	-.8753793	-.0071755
02/2018	-.4264186	.2228336	-1.91	0.056	-.8631647	.0103275
03/2018	-.2953128	.2242871	-1.32	0.188	-.7349076	.1442821
04/2018	-.2095437	.2260123	-0.93	0.354	-.6525198	.2334324
05/2018	-.030492	.2276016	-0.13	0.893	-.4765831	.4155991
06/2018	-.1604255	.2305315	-0.70	0.486	-.6122591	.2914082
cons	42.04246	.2220709	189.32	0.000	41.60721	42.47772

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Table F-13: Regression Coefficients for DEP Cohort 5

Number of obs	=	1042278
F(46,995879)	=	5675.15
Prob>F	=	0.0000
R-squared	=	0.6913
AdjR-squared	=	0.6769
Root MSE	=	13.8521

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
02/2015	7.859332	1.03145	7.62	0.000	5.837724	9.880939
03/2015	-14.72819	.5009908	-29.40	0.000	-15.71012	-13.74627
04/2015	-19.22476	.4593114	-41.86	0.000	-20.12499	-18.32452
05/2015	-12.46654	.4538566	-27.47	0.000	-13.35609	-11.577
06/2015	-2.073978	.4480566	-4.63	0.000	-2.952154	-1.195802
07/2015	-.6775616	.4404268	-1.54	0.124	-1.540783	.1856601
08/2015	-4.209871	.4292188	-9.81	0.000	-5.051125	-3.368616
09/2015	-11.54887	.4149626	-27.83	0.000	-12.36218	-10.73555
11/2015	-14.48223	.3958936	-36.58	0.000	-15.25817	-13.70629
12/2015	-9.743026	.3854937	-25.27	0.000	-10.49858	-8.987471
01/2016	-.4357276	.375123	-1.16	0.245	-1.170956	.2995008
02/2016	-3.248327	.3616983	-8.98	0.000	-3.957243	-2.53941
03/2016	-16.40977	.3412315	-48.09	0.000	-17.07857	-15.74096
04/2016	-20.83725	.2979269	-69.94	0.000	-21.42118	-20.25332
05/2016	-14.20739	.2083906	-68.18	0.000	-14.61583	-13.79895
06/2016	-3.413052	.175071	-19.50	0.000	-3.756185	-3.069919
07/2016	6.838243	.1635854	41.80	0.000	6.517621	7.158865
08/2016	5.001092	.1577112	31.71	0.000	4.691983	5.310201
09/2016	-4.802548	.1547891	-31.03	0.000	-5.105929	-4.499166
10/2016	-14.16475	.1541552	-91.89	0.000	-14.46689	-13.86261
11/2016	-9.006045	.154155	-58.42	0.000	-9.308183	-8.703906
12/2016	1.722556	.1541532	11.17	0.000	1.420421	2.024691
01/2017	.118167	.1541529	0.77	0.443	-.1839676	.4203015
02/2017	-6.008087	.1541516	-38.98	0.000	-6.310219	-5.705955
03/2017	-7.882833	.1541514	-51.14	0.000	-8.184965	-7.580702
04/2017	-11.17579	.1541501	-72.50	0.000	-11.47792	-10.87366
05/2017	-7.152663	.1541477	-46.40	0.000	-7.454788	-6.850539
06/2017	-.2981455	.1541465	-1.93	0.053	-.6002675	.0039764
07/2017	5.948751	.1541447	38.59	0.000	5.646632	6.250869
08/2017	1.368454	.1541421	8.88	0.000	1.066341	1.670568
09/2017	-4.875907	.1542055	-31.62	0.000	-5.178145	-4.57367

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11/2017	-6.410534	.1874958	-34.19	0.000	-6.77802	-6.043049
12/2017	8.676972	.1881879	46.11	0.000	8.30813	9.045814
01/2018	13.12556	.1888482	69.50	0.000	12.75542	13.4957
02/2018	-3.244625	.1895723	-17.12	0.000	-3.61618	-2.873069
03/2018	-5.659177	.1902589	-29.74	0.000	-6.032078	-5.286276
04/2018	-10.97504	.1910124	-57.46	0.000	-11.34941	-10.60066
05/2018	-5.355889	.1918697	-27.91	0.000	-5.731947	-4.979831
i.ym#c.treatment						
11/2017	.3283646	.1541795	2.13	0.033	.0261781	.6305512
12/2017	.9927588	.1554924	6.38	0.000	.687999	1.297519
01/2018	1.069641	.1566775	6.83	0.000	.7625586	1.376724
02/2018	.4895946	.1579523	3.10	0.002	.1800135	.7991757
03/2018	.3649788	.1591562	2.29	0.022	.053038	.6769196
04/2018	-.1933651	.1604854	-1.20	0.228	-.507911	.1211808
05/2018	-.5897201	.161981	-3.64	0.000	-.9071974	-.2722427
06/2018	-.7145588	.1645078	-4.34	0.000	-1.036989	-.3921291
cons	42.01288	.1400189	300.05	0.000	41.73845	42.28731

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Table F-14: Regression Coefficients for DEP Cohort 6

Number of obs	=	5818963
F(75,5679812)	=	25017.65
Prob>F	=	0.0000
R-squared	=	0.7158
AdjR-squared	=	0.7089
Root MSE	=	14.2181

Variable	Coefficient	Std. Err.	t	P > |t|	95% Conf. Interval	
i.ym						
12/2013	11.70871	.070371	166.39	0.000	11.57079	11.84663
01/2014	15.49768	.0697846	222.08	0.000	15.3609	15.63445
02/2014	12.08945	.0697845	173.24	0.000	11.95267	12.22622
03/2014	-.1279688	.0697845	-1.83	0.067	-.2647439	.0088064
04/2014	-10.09903	.0697843	-144.72	0.000	-10.2358	-9.962251
05/2014	-6.837694	.0697841	-97.98	0.000	-6.974468	-6.70092
06/2014	3.284255	.0697841	47.06	0.000	3.147481	3.42103
07/2014	4.081132	.069784	58.48	0.000	3.944358	4.217906
08/2014	1.764097	.0697838	25.28	0.000	1.627324	1.900871
09/2014	-3.757227	.069784	-53.84	0.000	-3.894001	-3.620452
10/2014	-10.33492	.0697845	-148.10	0.000	-10.4717	-10.19815
11/2014	-1.688237	.0697846	-24.19	0.000	-1.825012	-1.551461
11/2015	-9.232248	.0779718	-118.40	0.000	-9.38507	-9.079426
12/2015	-2.661476	.0779701	-34.13	0.000	-2.814295	-2.508657
01/2016	8.674027	.077972	111.25	0.000	8.521205	8.82685
02/2016	5.9907	.077972	76.83	0.000	5.837878	6.143522
03/2016	-8.838062	.0779925	-113.32	0.000	-8.990925	-8.6852
04/2016	-13.30352	.0780119	-170.53	0.000	-13.45643	-13.15062
05/2016	-9.44699	.0780375	-121.06	0.000	-9.599941	-9.294039
06/2016	2.194711	.0781436	28.09	0.000	2.041552	2.34787
07/2016	11.77389	.0782866	150.39	0.000	11.62045	11.92733
08/2016	10.30823	.0784133	131.46	0.000	10.15454	10.46192
09/2016	-2.183175	.0785551	-27.79	0.000	-2.33714	-2.029209
10/2016	-13.0053	.078674	-165.31	0.000	-13.1595	-12.8511
11/2016	-6.980919	.0787958	-88.60	0.000	-7.135356	-6.826482
12/2016	3.439117	.0788971	43.59	0.000	3.284481	3.593752
01/2017	1.318201	.0789975	16.69	0.000	1.163369	1.473033
02/2017	-5.036775	.0790875	-63.69	0.000	-5.191783	-4.881766
03/2017	-7.376649	.0791736	-93.17	0.000	-7.531826	-7.221471
04/2017	-10.63689	.0792945	-134.14	0.000	-10.7923	-10.48147
05/2017	-6.112698	.0793975	-76.99	0.000	-6.268314	-5.957082

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06/2017	1.366243	.079523	17.18	0.000	1.210381	1.522105
07/2017	8.161536	.0796641	102.45	0.000	8.005397	8.317675
08/2017	2.668037	.0798028	33.43	0.000	2.511626	2.824448
09/2017	-5.734664	.0799342	-71.74	0.000	-5.891332	-5.577996
10/2017	-10.82592	.0800463	-135.25	0.000	-10.98281	-10.66903
11/2017	-5.79847	.0801673	-72.33	0.000	-5.955595	-5.641345
12/2017	11.03428	.0802677	137.47	0.000	10.87696	11.1916
01/2018	15.14574	.0803662	188.46	0.000	14.98822	15.30325
02/2018	-2.586148	.0804608	-32.14	0.000	-2.743848	-2.428448
03/2018	-5.476302	.0805527	-67.98	0.000	-5.634182	-5.318422
04/2018	-11.58772	.0806566	-143.67	0.000	-11.7458	-11.42963
05/2018	-6.145941	.0807687	-76.09	0.000	-6.304244	-5.987637
i.ym#c.treatment						
11/2015	-.1657308	.0794857	-2.09	0.037	-.32152	-.0099416
12/2015	-.2809974	.0794828	-3.54	0.000	-.4367809	-.1252139
01/2016	-.4857805	.0794845	-6.11	0.000	-.6415674	-.3299937
02/2016	-.5875254	.0794857	-7.39	0.000	-.7433146	-.4317362
03/2016	-.3260493	.079533	-4.10	0.000	-.4819312	-.1701674
04/2016	-.1940438	.0795805	-2.44	0.015	-.3500187	-.0380688
05/2016	-.1250364	.0796366	-1.57	0.116	-.2811213	.0310485
06/2016	-.0957303	.0798921	-1.20	0.231	-.252316	.0608554
07/2016	-.0052869	.0802199	-0.07	0.947	-.162515	.1519411
08/2016	-.0813614	.0805005	-1.01	0.312	-.2391395	.0764166
09/2016	-.1006956	.0808235	-1.25	0.213	-.2591068	.0577156
10/2016	-.197732	.0810956	-2.44	0.015	-.3566765	-.0387876
11/2016	-.324476	.0813496	-3.99	0.000	-.4839184	-.1650337
12/2016	-.3983929	.0815737	-4.88	0.000	-.5582744	-.2385113
01/2017	-.3999776	.0817827	-4.89	0.000	-.5602688	-.2396864
02/2017	-.3528999	.0819735	-4.31	0.000	-.513565	-.1922349
03/2017	-.326023	.0821581	-3.97	0.000	-.4870499	-.1649961
04/2017	-.2227447	.0824171	-2.70	0.007	-.3842792	-.0612102
05/2017	-.1700432	.082627	-2.06	0.040	-.3319892	-.0080972
06/2017	-.097265	.0829011	-1.17	0.241	-.2597482	.0652182
07/2017	-.0851771	.0831946	-1.02	0.306	-.2482355	.0778814
08/2017	-.1316635	.0834652	-1.58	0.115	-.2952524	.0319254
09/2017	-.1896956	.0837418	-2.27	0.023	-.3538266	-.0255646
10/2017	-.2170639	.0839737	-2.58	0.010	-.3816494	-.0524785
11/2017	-.4155898	.0842191	-4.93	0.000	-.5806562	-.2505234
12/2017	-.7004644	.084429	-8.30	0.000	-.8659422	-.5349866
01/2018	-.6509102	.0846283	-7.69	0.000	-.8167788	-.4850417
02/2018	-.4346815	.0848319	-5.12	0.000	-.600949	-.268414

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03/2018	-.4591289	.0850171	-5.40	0.000	-.6257594	-.2924984
04/2018	-.3998165	.0852301	-4.69	0.000	-.5668645	-.2327686
05/2018	-.2731368	.0854661	-3.20	0.001	-.4406473	-.1056262
06/2018	-.2636914	.0861242	-3.06	0.002	-.4324918	-.0948909
cons	45.07433	.058409	771.70	0.000	44.95985	45.18881

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Appendix G   Awareness and Engagement

The increased engagement and awareness generated by the MyHER program can be difficult to measure. Nexant designed a survey approach that measures different aspects of the MyHER effect, but no one survey question can fully capture the numerous and subtle effects of MyHER that ultimately resulted in the observed energy impacts. Instead, one might expect the overall pattern of survey responses to signal a difference in behavior and attitudes between the MyHER treatment and control group.

Nexant developed a framework for measuring this pattern of MyHER influence by applying straightforward statistical concepts to develop a holistic look at the program's influence on customer behavior. While a single survey question may not result in statistically significant differences between the treatment and control group, if the treatment group responds more favorably than the control group to a set of survey questions, then we can estimate the probability that the collection of responses fits a hypothesis of MyHER influence.

Nexant assigned each survey question a category. Table G-1 and Table G-2 shows the categories, the count of questions in each category for which the treatment group provided a more favorable response than the control group, and the number of questions in each category, for each jurisdiction. A response is considered "favorable" if the treatment group gave a response that is consistent with the program objectives of MyHER.

Table G-1: Classification of Survey Responses and Treatment Group "Success Rate" - DEC

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-savings Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	4	11	36%
Barriers of Customer Not Undertaking Energy Savings Actions	3	6	50%
Customer Satisfaction with Duke Energy	0	4	0%
Total	**31**	**49**	**63%**

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Table G-2: Classification of Survey Responses and Treatment Group "Success Rate" - DEP

Question Category	Count of Questions where T>C	Number of Questions in Topic Area	Portion of Questions where T>C
Duke Energy's Public Stance on Energy Efficiency	3	3	100%
Customer Engagement with Duke Energy Website	2	5	40%
Customers' Reported Energy-saving Behaviors	10	11	91%
Customer's Reported Energy Efficiency Improvements Made	9	9	100%
Customer Motivation, Engagement & Awareness of Energy Efficiency	10	11	91%
Barriers of Customer Not Undertaking Energy Savings Actions	4	6	67%
Customer Satisfaction with Duke Energy	2	4	50%
Total	**40**	**49**	**82%**

If the MyHER program had no effect on participants' awareness, attitudes, and opinions, then we would expect the control group to score better than the treatment group on approximately half of the survey questions. The DEC treatment group provided answers consistent with a MyHER treatment effect in approximately 63% of the survey questions, and 82% in the case of DEP, which represents an uplift from the expected percentage of 50% if the null hypothesis were true. Thus we cannot make the case that MyHER had wide-ranging enhancing effects across all the various engagement and attitudinal areas probed by the survey. Using standard statistical techniques (the non-parametric sign test), Nexant calculates the probability of randomly obtaining this result in the case of DEC is 2% and in the case of DEP essentially 0%.

What do those 2% and 0% probabilities mean? Consider a series of coin flips. What is the probability of obtaining 40 heads in 49 coin flips if there is a 50/50 chance of obtaining a heads or tails on any one coin flip? This same principle can be applied to the survey: what is the probability that the treatment group gives a more favorable response to 40 out of 49 survey questions if MyHER has no influence on customer engagement and energy usage behavior? The answer, 0%, is "exceedingly low". The same logic applies to the 2% probability we calculate for DEC. Thus we conclude that the survey responses in these two jurisdictions favorably affects DEC and DEP customer attitudes and actions related to energy-saving behavior.[16]

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[16] The technical way of putting this is to say that we reject the hypothesis that MyHERs have no effect on customer engagement with energy-saving behaviors.

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Duke Energy Carolinas and Duke Energy Progress

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1. Evaluation Summary

1.1 Program Summary

The Duke Energy Carolinas' (DEC) and Duke Energy Progress' (DEP) Neighborhood Energy Saver Program (NES) provides one-on-one energy education, on-site energy assessments, and energy conservation measures to customers in selected low-income neighborhoods. These services are offered free of charge to all active DEC/DEP account holders who are individually metered homeowners and tenants living in predetermined income-qualified communities. Qualifying neighborhoods have at least 50% of households with incomes equal to or less than 200% of the federal poverty level[1].

The program employs a neighborhood canvass approach to drive participation, while working with existing organizations in each community to maximize the number of customers benefitting from the program. Each year, program teams aim to reach approximately 4,500 customers in the DEP and 8,900 customers in the DEC service territory in several preselected communities throughout North and South Carolina.

The program period under evaluation is June 1st, 2017 through June 30th, 2018.

1.2 Evaluation Objectives

The objectives of the 2017-2018 NES Program evaluation are to:

■ Review and update, as necessary, deemed savings estimates through a review of measure assumptions and calculations.

■ Verify measure installation and persistence.

■ Estimate program energy (kWh), summer and winter peak demand (kW) savings, and realization rates.

■ If possible, discern the difference in energy savings between participating homes heated electrically from those heated with natural gas.

■ Identify barriers to participation in the program and recommend strategies for addressing those barriers.

■ Identify and characterize program strengths, which may include customer engagement and other non-energy benefits.

■ Identify ways the DEP/DEC NES Program may be improved in the future.

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1 As of January 1, 2017, qualifying neighborhoods in the DEP service territory must meet this threshold. Previously, qualifying neighborhoods were those where 50% of households had incomes equal to or less than 150% of the federal poverty level.

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To achieve these objectives, Opinion Dynamics completed a number of data collection and analytic activities, including interviews with program staff, a participant survey, an analysis of survey results, an analysis of program-tracking data, a deemed savings review, and an engineering analysis.

1.3   High Level Findings

Overall, NES Program teams in DEP and DEC territories implemented the program effectively and have achieved a high penetration rate in target neighborhoods. The program team served 15,312 participants across both territories and had a 69% penetration rate. There were 11,079 participants in the DEC service territory, 124% of the DEC participant target, and 4,233 participants in the DEP service territory, 94% of the DEP participant target. In addition, the evaluation found high levels of program satisfaction; 96% of DEP and 99% of DEC participants reported they were somewhat or very satisfied with the program overall, and 99% of participants from both territories reported they were somewhat or very satisfied with the equipment they received through the program.

Impact Evaluation

In previous NES evaluations, Opinion Dynamics used a billing analysis to determine program energy savings. However, due to differences in the usage patterns of the treatment and comparison groups and large differences in weather patterns between the pre- and post-treatment periods, a billing analysis was not feasible to evaluate this program cycle (see Section 4.3 for more details). As such, the team used an engineering analysis to determine both energy and demand savings. Table 1-1 and

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Table 1-2 present the total gross energy and demand savings for each measure installed through the program and the estimated individual measure contribution to the overall energy (kWh) savings from the engineering analysis. The results are presented separately for each service territory.

Table 1-1. Total Measure-Level Gross Energy Savings Results from Engineering Analysis

Measures	DEP		DEC	
	Energy (MWh)	Percent of total MWh	Energy (MWh)	Percent of total MWh
Lighting	1,412	43%	2,842	38%
Low Flow Showerhead	797	24%	1,955	26%
Infiltration Reduction	436	13%	955	13%
Efficient Aerator	334	10%	734	10%
HVAC Filters	150	5%	313	4%
Pipe Insulation (5 feet sections)	97	3%	423	6%
Water Heater Insulation Wrap	71	2%	266	4%
Total	3,298	100%	7,449	100%

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Table 1-2 Total Measure-Level Gross Demand Savings Results from Engineering Analysis

Measure	DEP				DEC			
	Summer Coincident Demand		Winter Coincident Demand		Summer Coincident Demand		Winter Coincident Demand	
	kW	%	kW	%	kW	%	kW	%
Lighting	209	48%	101	24%	421	42%	204	22%
Low Flow Showerhead	37	9%	75	17%	85	9%	170	19%
Efficient Aerator	18	4%	36	8%	42	4%	84	9%
Infiltration Reduction	106	24%	155	36%	253	25%	308	34%
HVAC Filters	48	11%	43	10%	115	12%	76	8%
Pipe Insulation (5 feet sections)	11	3%	11	3%	48	5%	48	5%
Water Heater Insulation Wrap	8	2%	8	2%	30	3%	30	3%
Total	437	100%	428	100%	994	100%	921	100%

During the 2017-2018 evaluation period, DEP participants saved an average of 779 kWh and DEC participants saved an average of 676 kWh per household (see Table 1-3).

Table 1-3. Per Household Energy and Demand Savings

Service Territory	Energy Savings (kWh)	Summer Peak Demand (kW)	Winter Peak Demand (kW)
DEP	779	0.103	0.101
DEC	676	0.090	0.083

Per household energy savings for this evaluation period were substantially higher than engineering estimates from previous evaluations. Higher savings per household in the 2017-2018 evaluation period were driven, in part, by a larger share of participants with electric space and water heating (Figure 1-1). Given the mix of measures offered through the NES Program, energy savings from domestic hot water and infiltration measures represent a large portion of potential program savings. To realize electric savings from these measures at the household-level, participants need to heat their homes or hot water with electricity. As such, a higher share of participants that heat with electric fuel will yield more energy savings per household.

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Figure 1-1. Share of DEP and DEC Participants with Electric Space and Water Heating
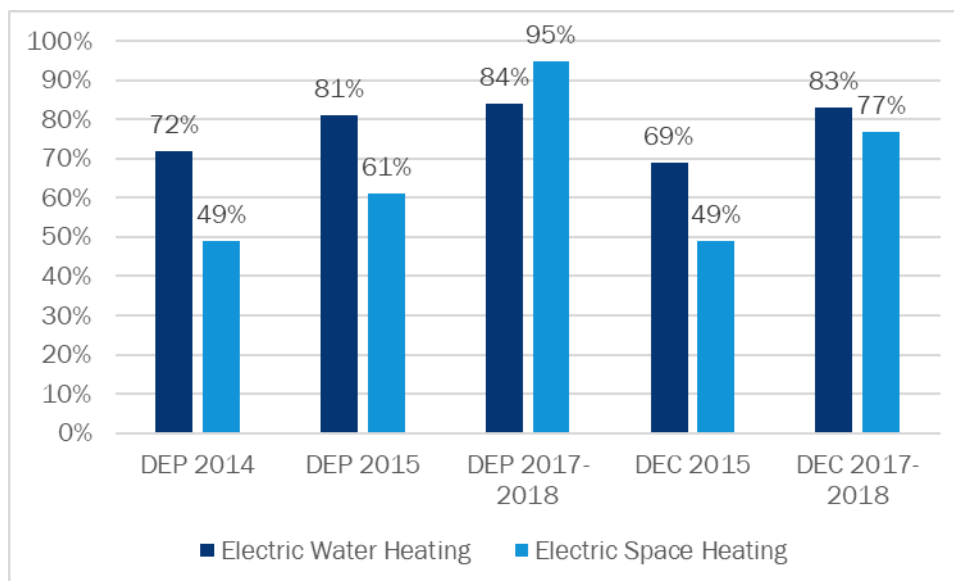
Process Evaluation

The research team focused the process evaluation on several questions related to energy education, behavior change, additional savings opportunities, NES participant satisfaction, and the overall effectiveness of the program. The full results are available in Section 4.3; key findings are summarized below.

- Program participation was strong in both service territories. Between June 1st, 2017 and June 30th, 2018, 4,233 DEP and 11,079 DEC customers participated in the NES Program. This represented 69% of households within targeted neighborhoods.

- Customer satisfaction was high in both service territories overall (96% of DEP and 99% of DEC participants were somewhat or very satisfied). Both DEP and DEC participants were also satisfied with the equipment they received (99% in both territories) and the NES Program representatives (99% and 91%, respectively).

- The majority of NES participants (91%) received in-person education and 89% thought that information helped them save energy in their homes. Additionally, participants reported that they were more knowledgeable about ways to save energy in their homes after their NES participation than they were before. As such, NES participants reported taking a range of additional energy saving actions in their homes (e.g., turning off lights more frequently, keeping doors and windows closed, washing clothing in cold water, etc.).

- Participants reported experiencing a variety of non-energy benefits after participating in the NES Program. The majority of NES participants reported noticing a decrease in their electric bill after participating (54%-DEP, 55%-DEC). Additionally, 92% of DEP and 84% of DEC participants felt that their home was less drafty, and 86% and 73%, respectively, reported noticing a change in the comfort of their home.

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1.4   Evaluation Recommendations

Opinion Dynamics has the following recommendations for maintaining and improving program performance and overall savings. More details on these recommendations are included in Section 6.1 and throughout this report.

- **NES program teams should consider including space and water heating fuel types as additional criteria for identifying and selecting neighborhoods for future program years.** As the NES offers a relatively limited set of easy-to-install measures by design, domestic hot water and air infiltration measures will continue to contribute a substantial portion to total program savings. However, energy savings only manifest from those measures in households that heat their homes or their hot water with electricity. To maximize savings per participating household, NES Program staff should consider targeting neighborhoods with higher rates of electric space and water heating.

- **NES Program staff should continue to emphasize air infiltration measures.** While infiltration measures make an important contribution to overall program energy savings (14% of DEP and DEC participants), NES participants that receive those measures also report other valuable non-energy benefits. Of those that received infiltration measures, 92% of DEP and 84% of DEC participants reported that their home was less drafty and 86% and 73%, respectively, reported noticing a change in the comfort of their home. Of those who noticed a difference in home comfort, 90% of DEP and 80% of DEC felt that keeping a comfortable temperature in their home was easier after their NES participation. Air infiltration measures may be important in driving participant non-energy benefits in the future.

- **NES Program staff should continue to emphasize the in-person educational component of the program.** The majority of DEC and DEP participants (91%) receive in-person education from implementation teams and 89% find the educational component of the program useful in helping save energy in their homes. This sort of in-person education can provide a valuable touch point between program representatives and Duke Energy customers, and also encourages various different types of energy-saving behavior change (see Section 5.3.4).

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2.   Program Description

2.1   Program Design

The DEC and DEP NES Program offers direct-install measures and employs a neighborhood canvassing approach to drive participation. The goal is to offer persistent energy savings to income-qualified customers through the direct installation of energy-saving measures. The program also provides participating customers with information on the measures that they received and additional suggestions on ways to lower energy use. Implementation teams provide measures and services at no cost to customers and collaborates with existing neighborhood organizations to promote the program and maximize the number of customers benefitting from the receipt of energy conservation measures.

Neighborhoods can be selected to participate in the program if at least 50% of households in the neighborhood have incomes equal to or less than 200% of the federal poverty level[2]. Implementation teams aim to reach approximately 8,900 customers in the DEC service territory and 4,500 customers in the DEP service territory in several preselected communities throughout North Carolina and South Carolina. Participating households are limited to a one-time receipt of energy efficiency measures through the program.

2.2   Program Implementation

Honeywell Building Solutions (Honeywell) implemented the 2017-2018 DEC-DEP NES Program in partnership with Duke Energy program staff. The implementer performs all assessments and installations. DEC and DEP program staff are heavily involved in selecting specific neighborhoods based on program eligibility criteria.

Prior to participating in the program, residents in selected neighborhoods receive targeted mailings that provide introductory information about how to participate; the benefits of participation; and a notice that additional information from program staff will be circulated throughout their community, including additional mailings and a community launch event. The implementation team organizes at least one community launch event in each targeted neighborhood, both to make residents aware of the program and to provide demonstrations of the measures that the NES Program offers.

The implementation team records measure installation information at each premise, which Duke Energy tracks in its program-tracking database. Program representatives also record the location in which they installed lighting measures and faucet aerators (i.e., kitchen or bathroom), along with household characteristics, such as primary heating fuel type and the type of heating and cooling equipment present in each participating household. Finally, implementation teams leave behind educational materials that explain the measures that they install in each home, additional recommendations for how participants could save energy through behavioral changes, and information about other Duke Energy programs that may be of interest.

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2 As of January 1, 2017, qualifying neighborhoods in the DEP service territory must meet this threshold. Previously, qualifying neighborhoods were those where 50% of households had incomes equal to or less than 150% of the federal poverty level.

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2.3   Program Performance

The program period under evaluation is June 1st, 2017 through June 30th, 2018. Over this period, the program teams served 15,312 households in 24 neighborhoods in North and South Carolina. Based on engineering estimates, participants save an average of 779 kWh per household per year in DEP territory and 676 kWh per household per year in the DEC territory. Energy and demand savings by service territory are displayed in Table 2-1.

Table 2-1. Energy Savings per Household

Per Household Savings	kWh	Summer kW	Winter kW
DEP	779	0.103	0.101
DEC	676	0.090	0.083

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3.   Overview of Evaluation Activities

To answer the research objectives outlined in Section 1.2, Opinion Dynamics performed a range of data collection and analytic activities, including:

- Interviews with DEP and DEC program staff;

- A review of program materials and program tracking data;

- Participant telephone survey

- An engineering analysis of deemed savings.

In Sections 4 and 4.3, we provide more details on the methods and results of the impact and process analyses, respectively. Below, we summarize the scope and approach for the staff interviews, the program materials and data review, the engineering analysis, and the participant survey. Each of these components supported either the impact or the process evaluations.

3.1   Program Staff Interviews

Opinion Dynamics conducted an in-depth interview with program staff responsible for program administration in 2017-2018. The in-depth interview allowed us to discuss implementation of the NES Program in DEP and DEC territories, including differences between the DEP/DEC program and program implementation in other Duke Energy territories. We also used this interview to identify program successes, to discuss any difficulties in administering the program, and to determine any risks for the program achieving its goals.

3.1   Program Materials and Data Review

DEC and DEP program administration staff provided Opinion Dynamics with information on the program. These data included the program marketing materials, program tracking databases, and other program documents—such as NES implementation requirements, educational procedures, and contractors' on-site auditing and direct installation procedures. Review of these materials informed development of the participant survey instrument and the engineering analysis.

Each of these materials is further described below.

- **Marketing Materials.** Opinion Dynamics reviewed the leave-behind brochure, the customer survey booklet, the pre-participation program informational brochure, the leave-behind door hanger, the energy efficiency brochure about other Duke Energy programs, the introduction letter to the NES Program and the informational session, examples of the presentation shown at the informational sessions, and postcards sent to participants with information about how to participate.

- **Program Databases.** The program staff provided Opinion Dynamics with program-tracking data from June 1st, 2017 to June 30th, 2018. The databases provided us with information on the quantities, location (in some cases), and types of measures installed in each treated household.

- **Program Documents.** The program documents that we reviewed included statements of work between Duke Energy and Honeywell as well as the NES Program guide. The guide explained the program

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implementation process, including homeowner eligibility, communication, scheduling, and assessment and installation, as well as a description of installed measures.

3.2   Participant Survey

The purpose of the participant survey was to collect information to support the process evaluation and development of in-service rates. Opinion Dynamics implemented the survey as a computer-assisted telephone interviewing (CATI) survey between July 11th - August 1st, 2019. We completed a total of 140 interviews and achieved a response rate of 20.5%; the average length of the interviews was 22 minutes.

The survey sample frame consisted of 14,442 NES participants that enrolled between June 1st, 2017 and June 6th, 2018.[3] Our team removed 3,300 records that were missing phone numbers, 2,298 records that were on Duke's "Do Not Call" list, and 393 records that were duplicates. We developed a simple random sample of the remaining 8,451 records. The survey final sample frame consisted of a preliminary extract of 550 DEP and 630 DEC measure-level participant records.

To meet precision targets for measure-level installation and persistence analyses, the evaluation team set quotas for each measure. Quotas were set at 68 to ensure that analyses met the industry-standard two-tail 90/10 criterion in terms of sampling error at a measure level. This means that we would be 90% confident that our results are within 10% of the true value in the population.

3.3   Engineering Analysis

Opinion Dynamics conducted an engineering analysis to estimate energy and demand savings for the 2017-2018 evaluation period.[4] We first adjusted the per-unit savings for each measure based on the deemed savings review described in this section using the in-service rates developed through the participant survey (see Section 4.1). We then estimated total program savings by applying the adjusted per unit savings to each participant based on the package of measures they received, their heating fuel, and the presence or absence of different types of heating and cooling equipment.[5]

 In previous evaluations of the NES Program, Opinion Dynamics has conducted a billing analysis to determine the net savings attributable to the NES Program during the evaluation period. While this approach has been successful in previous evaluations, we were unable to apply this method to the 2017-2018 DEC-DEP evaluation due to lack of equivalency between the treatment and comparison groups and differences in weather patterns for pre- and post-treatment years. The combination of both factors did not allow for our team to control for potential exogeneous effects that biased results. For more detail, see Section 4.3.

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[3] Opinion Dynamics conducted a survey of participants from 11 months of the evaluation period to ensure that participants would be able to report feedback as close to their participation date as possible.

[5] For participants that did not have information related to heating/hot water fuel type or heating/cooling equipment in their homes tracked in the NES Program tracking data, Opinion Dynamics applied per-unit savings for specific measures weighted by the share of each population with the appropriate equipment and fuel type.

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3.3.1   Deemed Savings Review

The primary goal of the deemed savings review is to develop updated savings algorithms and input assumptions that are consistent with standard industry practice and comparable with applicable Technical Reference Manuals (TRMs).

To conduct our deemed savings review, we performed the following steps:

- Reviewed the prior evaluation report, for the 2015–2016 NES Program years;
- Analyzed program tracking data to compile household characteristics (e.g., primary heating fuel type) to be used in estimating deemed savings for individual measures;
- Reviewed all other secondary information, including the program manual and the technical specifics of efficient equipment offered through the program; and
- Reviewed the latest Illinois, Indiana, and Mid-Atlantic TRMs, along with other recently published studies where relevant, to determine if there was a need for additional updates.

Error! Reference source not found. provides more detail on the methods used in the deemed savings review and engineering analysis.

3.4   Billing Analysis

In previous evaluations of the NES Program, Opinion Dynamics has conducted a billing analysis to determine the net savings attributable to the NES Program during the evaluation period. Opinion Dynamics attempted a billing analysis using a linear fixed effects regression (LFER) model; however, after testing several different model specifications, we determined that a billing analysis was not an effective method for evaluating NES Program impacts for the 2017-2018 evaluation period. Our team tested models that attempted to control for all household factors that do not vary over time by the individual constant terms in the equation. We used participants from the second half of 2018 and first half of 2019 as a comparison group. For more detail on our approach, see Section 4.3.

4.   Gross Impact Evaluation

The gross impact evaluation for the 2017-2018 DEP/DEC NES Program consisted of two distinct steps: (1) verification of measure installation and continued operation; and (2) engineering analysis, including review of deemed savings values for incented measures. This section describes the methodologies and results of both steps.

4.1   Measure Verification

4.1.1   Measure Verification Methodology

The participant survey included questions designed to verify that participants received and installed program measures and that those measures remained in place and operational. The "in-service rate" (ISR) for each measure represents the share of measures in the program-tracking data that was still in service at the time of the survey, based on 140 completed telephone interviews (70-DEP, 70-DEC).

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Figure 4-1 outlines the method for deriving the ISR for each measure. During the survey, we asked participants to confirm that they received the quantity of measures recorded in Duke Energy's program-tracking data and, when necessary, to provide the correct quantity. We also asked participants to confirm the quantity of measures that were installed and remained in service at the time of the survey.

Figure 4-1 In Service Rate Components

A) Reported
- Total quantity of measures in the program-tracking data

B) Received
- Total quantity of measures that customers confirmed receiving

C) Installed
- Total quantity of the received measures that customers confirmed were installed

D) In Service
- Total quantity of measures that customers confirmed as still installed

First-year ISR is the proportion of measures that remained in use at the time of the survey (ISR = D ÷ A)

Based on the survey responses, we calculated the verification, installation, and persistence rates, as well as the resulting ISR – using the equations shown below – for each participant and each measure they received. We then developed jurisdiction-specific averages of all four rates for each measure group (see Table 4-1).

1) $Verification\ Rate = \dfrac{(B)Received\ Quantity}{(A)Reported\ Quantity}$

2) $Installation\ Rate = \dfrac{(C)Installed\ Quantity}{(B)Received\ Quantity}$

3) $Persistence\ Rate = \dfrac{(D)In\ Service\ Quantity}{(C)Installed\ Quanhtity}$

$$First\ Year\ ISR = In\ Service\ Measures\ (D) \div Reported\ Measures\ (A)$$

In previous evaluations of the NES Program, Opinion Dynamics found that participants were unable to verify certain measures (e.g., water heater temperature setbacks, water heater tank and pipe wraps). For these measures, we assumed 100% for all four rates. Additionally, for some air infiltration measures, such as caulking or glass patch tape, participants are unable to verify installation and persistence of individual measures. As such, we asked participants to verify installation of the entire package of air infiltration measures and assume 100% of those treatments remain installed. As all NES measures are installed directly by program staff and these measures specifically are difficult to remove, we feel that these assumptions are reasonable

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for this type of program. Finally, ISRs for HAVC filters are based on verification that participants received the filters, and changed their filters at least once per year.

4.1.2   Measure Verification Results

The results of this analysis showed high ISRs for measures in both DEC and DEP service territories, as shown in Table 4-1. Overall, both DEP and DEC participants reported that most measures were still in service at the time of the participant survey. All results are significant at the 90% confidence level with +- 10% relative precision.

Table 4-1. First Year Measure In-Service Rates

Measure Category	DEP				DEC			
	Verification Rate	Installation Rate	Persistence Rate	ISR	Verification Rate	Installation Rate	Persistence Rate	ISR
LEDs	98%	100%	93%	92%	98%	100%	96%	94%
Low Flow Showerheads	100%	100%	96%	96%	99%	100%	98%	97%
Faucet Aerators	98%	100%	98%	97%	96%	100%	99%	94%
Infiltration Measures	94%	N/A	N/A	94%	92%	N/A	N/A	92%
HVAC Filters	90%	92%	N/A	83%	89%	90%	N/A	80%

4.2   Engineering Analysis

4.2.1   Engineering Analysis Methodology

The engineering analysis for the 2017-2018 NES Program consisted of a deemed savings review of each incented program measure and application of measure-specific ISRs to develop ex post program savings.

To develop per-unit savings, we used several resources. Since neither North Carolina nor South Carolina has a statewide TRM, we relied on the IL, IN, ARK, and Mid-Atlantic TRM and secondary sources, as necessary, for algorithms and assumptions. As NES implementation teams collect characteristics of participating households, our engineering team used inputs from the DEP and DEC program-tracking data wherever possible. For more information on the algorithms and inputs that our engineering team used to develop deemed savings estimates for each measure, see **Error! Reference source not found.**.

When developing total program savings, Opinion Dynamics applied measure-specific per-unit savings estimates (excluding ISRs) to all participants who received each measure. Where savings for certain measures relied on households having specific heating/cooling equipment or fuel types, our engineering team only applied savings for those measures to participants who received them and had the appropriate

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mix of fuel and equipment.[6] For example, NES implementation teams provide domestic hot water measures to all participants, regardless of the fuel they use to heat water in their homes. However, as Duke Energy only provides electricity to DEP and DEC customers, when developing total program savings, our team only applied savings for domestic hot water measures to participants that received them and heated their water with electricity. Once the engineering team applied savings appropriately to the participant population, we applied measure-level ISRs to develop total program savings. We then calculated per household savings by dividing total program savings by the total number of participants.

4.2.2   Engineering Analysis Results

This remainder of this section provides gross energy and demand savings estimates for each measure offered by the NES Program, along with total program savings and per household savings estimates for the 2017-2018 evaluation period.

Ex-Post Deemed Savings Estimates

Table 4-2 provides the estimated gross per-unit energy and demand savings for all measures installed through the NES Program. As described in Section 3.3, we based the measure-level savings on secondary research and applied NES Program-specific assumptions on household characteristics, where applicable. The estimates shown below are for households with the appropriate mix of heating and cooling equipment, and electric heat or hot water. For example, savings from kitchen faucet aerators would only be realized by households with an electric water heater.

Table 4-2. Ex Post Per-Unit Deemed Savings Estimates

Measure	Energy savings (kWh)		Summer Peak Demand (kW)		Winter Peak Demand (kW)	
	DEP	DEC	DEP	DEC	DEP	DEC
Lighting						
LEDs (75W equivalent)	42	42	0.0061	0.0061	0.0030	0.0030
LEDs (60W equivalent)	33	33	0.0049	0.0049	0.0024	0.0024
LEDs (40W equivalent)	24	24	0.0035	0.0035	0.0017	0.0017
LEDs 5 W or similar - Candelabra Bulbs	21	21	0.0031	0.0031	0.0015	0.0015
LED 5 W or similar - Globes	21	21	0.0031	0.0031	0.0015	0.0015
Domestic Hot Water						
Low Flow Showerhead	226	255	0.0084	0.0081	0.0168	0.0162
Water Heater Insulation Wrap	105	96	0.0110	0.0110	0.0110	0.0110
Pipe Insulation (5 feet sections)	83	83	0.0094	0.0094	0.0094	0.0094
Kitchen Faucet Aerator	95	67	0.0035	0.0034	0.0070	0.0068
Bathroom Faucet Aerator	14	10	0.0010	0.0010	0.0020	0.0020
Air Sealing						
Infiltration Reduction	120	103	0.0295	0.0275	0.0190	0.0182
HVAC						

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[6] For participants that did not have information related to heating/hot water fuel type or heating/cooling equipment in their homes tracked in the NES Program tracking data, Opinion Dynamics applied per-unit savings for specific measures weighted by the share of each population with the appropriate equipment and fuel type.

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HVAC Filters	52	46	0.0147	0.0152	0.0112	0.0103

Total Program Savings

Our team calculated total program savings by applying the per-unit estimates shown in Table 4-2 to each participant that received the corresponding measure.[7] We then applied the ISRs shown in Table 4-1 and, where applicable, multiplied the per-unit estimate by the measure quantity installed in each participating household. Table 4-3 below summarizes total gross program energy and demand savings, by jurisdiction and measure, for the 2017-2018 evaluation period.

Table 4-3. Total Gross Program Savings

Measure	Energy savings (kWh)		Summer Peak Demand (kW)		Winter Peak Demand (kW)	
	DEP	DEC	DEP	DEC	DEP	DEC
Lighting						
LEDs (60W equivalent)	1,163,401	2,195,813	172	325	83	157
LEDs 5 W or similar - Candelabra Bulbs	140,116	354,045	20.7	52.4	10	25.3
LEDs (75W equivalent)	59,798	91,262	8.85	13.5	4	6.53
LED 5 W or similar - Globes	44,762	164,478	6.62	24.3	3	11.8
LEDs (40W equivalent)	4,067	36,989	0.602	5.47	0.3	2.65
Domestic Hot Water						
Low Flow Showerhead	797,101	1,954,742	37.4	85.0	75	170
Kitchen Faucet Aerator	280,402	622,664	12.9	31.3	26	62.5
Pipe Insulation (5 feet sections)	97,387	423,152	11.1	48.3	11	48.3
Water Heater Insulation Wrap	71,352	266,243	8.14	30.4	8	30.4
Bathroom Faucet Aerator	53,622	110,904	4.85	10.9	10	21.7
Air Sealing						
Infiltration Reduction	436,437	955,256	106	253	155	308
HVAC						
HVAC Filters	149,881	313,208	47.9	115	43	76.0
Total Program Savings	3,298,328	7,488,755	437	994	428	920
Savings per Household	779	676	0.103	0.090	0.101	0.083

Using the total gross savings values from Table 4-3 and the total number of participants, we calculated per household energy savings of 779 kWh for DEP and 676 kWh for DEC neighborhoods. The majority of these savings are attributable to lighting and low-flow showerhead installations. As shown in Figure 4-2 lighting

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[7] Certain measures only generate electric savings in households with electric space or water heating, or central cooling (i.e., domestic hot water, infiltration reduction, and HVAC filters). For these measures, we only applied savings to those households with the appropriate mis of electric heating, hot water, or cooling equipment. In cases where individual participants did not have space or water heating fuel type information in the program tracking data, we weighted per-unit savings by the share of participating households with the appropriate fuel type.

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accounted for 1,427 MWh (43%) of overall savings in DEP territory and 2,892 MWh (38%) of savings in DEC territory. Low-flow showerhead installations accounted for 797 MWh (24%) and 1,975 MWh (26%) of savings in DEP and DEC territories, respectively.

Figure 4-2 Measure Contribution to Total Energy (kWh) Savings
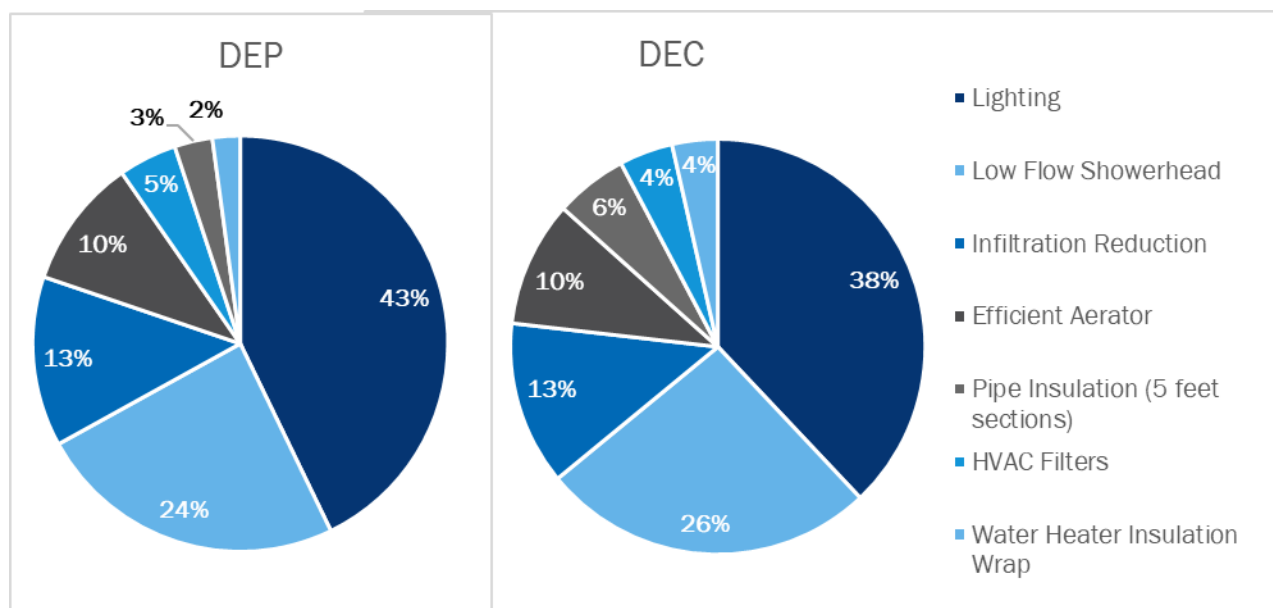
Comparison to Previous Impact Analyses

As noted earlier, due to drastically different weather patterns and an inequivalent comparison group, Opinion Dynamics was unable to rely on a billing analysis and determined that an engineering analysis was a more reasonable approach to estimating ex post program impacts for this evaluation period. To ensure that engineering analysis results can be a reliable proxy for billing analysis results for the NES Program, we compared impact results from the two methods derived for previous DEP and DEC evaluations. Table 4-4 below provides per household energy savings estimates for both methods, based on DEP and DEC evaluations for the 2014 and 2015 program years, along with the ratio of the billing-to-engineering estimates. The results show generally good agreement of the two methods.

Table 4-4. Historical Per Household Billing-to-Engineering Savings Comparisons

Service Territory and Evaluation Year	Per Household Savings Estimates (kWh)		Ratio of Billing/Engineering
	Billing Analysis	Engineering	
DEP 2014	367	379	97%
DEP 2015	430	478	90%
DEC 2015	347	333	104%

When compared with per household savings estimates from previous years, results from the 2017-2018 evaluation period are higher (see Table 4-5). There are two main factors that may contribute to this. First, as seen in Table 4-5, participants in the 2017-2018 evaluation period had higher rates of electric water, space heating, and central air conditioning, so energy savings from domestic hot water, air infiltration, and HVAC measures applied to a larger share of participants. Also, Opinion Dynamics made updates to certain

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parameters used in estimating per-unit savings during the deemed savings review based on more recent editions of technical resources (see **Error! Reference source not found.**).

Table 4-5. Comparison of Per Household Savings Estimates and Characteristics

	DEP			DEC	
	2014	**2015**	**2017-2018**	**2015**	**2017-2018**
Per Household kWh Estimates (Engineering)	*379*	*478*	*779*	*333*	*676*
Share of Participants with Electric Hot Water	72%	81%	84%	69%	83%
Share of Participants with Electric Heat	49%	61%	95%	49%	77%
Share of Participants with Central AC	50%	66%	77%	64%	72%

Measure Installation

To evaluate the success of the program in providing energy-saving measures to participants, and to determine if there were missed savings opportunities or measures that were being provided less frequently than in past years, Opinion Dynamics examined the number of measures provided to each home. Table 4-6 shows the share of homes that received at least one of each measure and the average quantity installed per home. DEP and DEC territories had similar measure mixes overall, although homes in DEC territory had a fewer LEDs installed on average than homes in DEP territory (12.2 compared to 9).

Table 4-6. Measure Installation Rates from Program-Tracking Data

Measure Category	Measure	DEP		DEC	
		Percent of Projects with Measure	Average Qty Per HH	Percent of Projects with Measure	Average Qty Per HH
Lighting	LEDs (60W equivalent)	93%	9.3	85%	6.3
	LEDs 5 W or similar - Candelabra Bulbs	38%	1.8	33%	1.6
	LED 5 W or similar - Globes	14%	0.6	18%	0.8
	LEDs (75W equivalent)	5%	0.5	3%	0.2
	LEDs (40W equivalent)	1%	<0.1	2%	0.1
Hot Water	Kitchen Faucet Aerator	85%	0.9	78%	0.8
	Low Flow Showerhead	82%	1.1	71%	0.9
	Bathroom Faucet Aerator	78%	1.1	71%	0.9
	Pipe Insulation (5 feet sections)	19%	0.3	29%	0.5
	Water Heater Insulation Wrap	18%	0.2	25%	0.3
Infiltration Reduction	Caulking	77%	0.8	78%	0.8
	Weather-stripping per door	70%	1.1	73%	1.1
	Foam Insulation	53%	0.6	57%	0.6
	Door Sweep	51%	0.8	40%	0.5
	Cover for A/C	24%	0.4	26%	0.5
	Poly Tape	0.3%	<0.1	3%	<0.1
HVAC	HVAC Filters	74%	9.2	68%	8.1
Education/Other	Water Heater Temp Check	94%	1	95%	1

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	Thermometer	97%	1.0	94%	0.9
	Refrigerator coil brush	--	--	0.1%	<0.1

4.3   Billing Analysis

In previous Duke NES evaluations, Opinion Dynamics conducted a billing analysis to determine the overall evaluated net savings of the NES Program. Billing analyses capture savings attributable to the program, including installed measures, behavioral changes, and participant spillover. In past DEP and DEC evaluations, we have compared the energy usage of the treatment group, those that participated in the NES Program during the evaluation period, with the usage of a comparison group. Comparison groups must have similar usage patterns to those in the treatment group prior to their enrollment in the program. To avoid self-selection bias, i.e. the correlation between the propensity to participate in a program and energy use, in previous DEP and DEC evaluations, we used future NES participants as the comparison group.

As billing analyses require a comparison between energy usage between pre- and post-treatment periods, successful analyses control for differences in weather patterns between the two periods. In cases of large weather differences between the two periods, the use of an equivalent comparison group is critical to control for other changes in behavior that may coincide with major weather differences. Figure 4-3 shows how the energy consumption differed between the treatment and comparison group from the early 2016 to early 2019. While usage patterns varied between the two groups in both service territories, DEP treatment and comparison groups were particularly incompatible in terms of energy consumption.

Figure 4-3. Treatment and Comparison Group Energy Usage
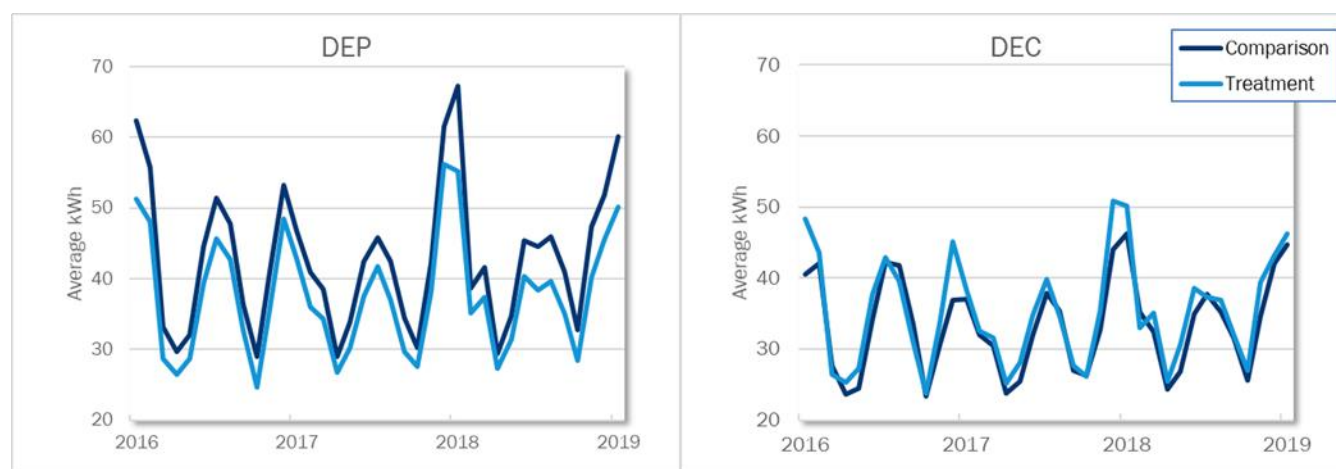
Across both service territories, the evaluation period was substantially colder than the pre-treatment period. Figure 4-4, shows the differences in average monthly temperatures between the two time periods. With inequivalent comparison groups, and substantially different weather patterns from year-to-year, models were unable to control for exogenous factors that may have influenced energy usage in NES participant households.

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Figure 4-4. Average Monthly Temperature
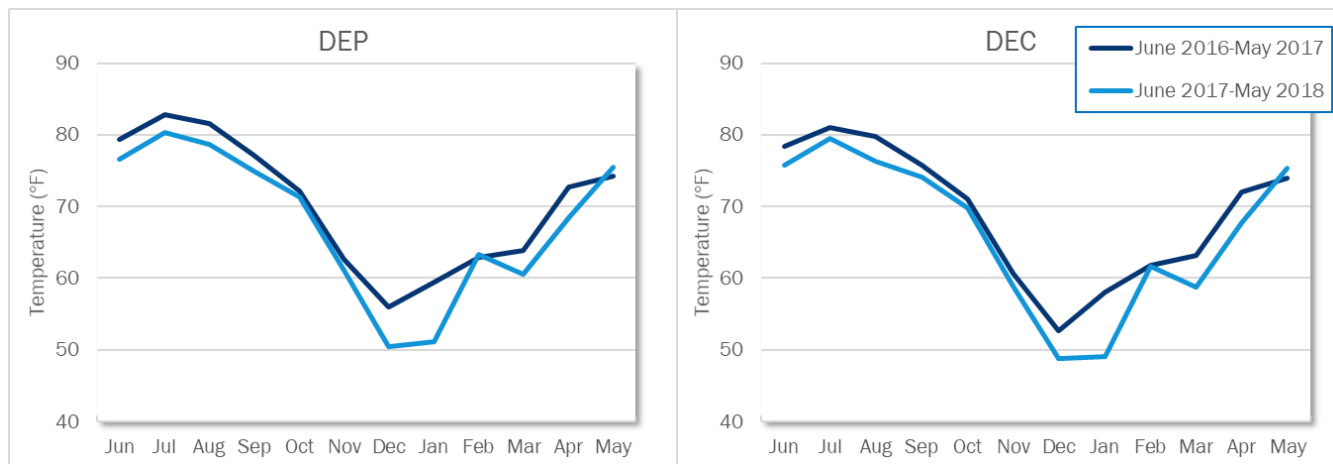
4.3.1 Model Results

Opinion Dynamics tested several different model specifications and determined that, due to the wide variation in modeled results largely driven by the 2 factors discussed in this section, a billing analysis was not an appropriate method for evaluating the impacts for the 2017-2018 NES evaluation period. Table 4-7 below shows the parameter estimates from the final model.

Table 4-7. Results of Billing Analysis Model Parameter Estimates

Variable	DEP		DEC	
	NC	SC	NC	SC
NES Participation (i.e., treatment effect)	7.624**	-0.650	-1.910**	1.775
Cooling Degree Days (CDD)	2.084**	1.946**	1.862**	1.513**
Heating Degree Days (HDD)	1.533**	1.893**	0.995**	1.193**
Post-Participation Period CDD	-0.336**	1.432**	-0.654**	0.528**
Post-Participation Period HDD	-0.392**	0.117	0.162**	-0.122*
Constant	0.0	0.0	0.0	0.0
Observations	83,418	75,451	260,123	89,027
R-squared	0.321	0.327	0.221	0.230
Monthly Effects Included	YES			
Post-Participation Period Interacted with Months Included	YES			
Treatment Group Interacted with Months Included	YES			

* $p < 0.05$, ** $p < 0.01$.

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5. Process Evaluation

5.1 Researchable Questions

Based on experience evaluating this program in previous years and discussions with DEC and DEP program staff, Opinion Dynamics developed the following process-related research questions:

- What are the major strengths of the program? Are there specific ways that the program could be improved to be more effective in the future?

- What are the barriers to implementing this program—that is, are there limiting factors to achieving greater participation and realizing additional program attributable savings?

- Do NES participants realize other non-energy benefits as a result of their participation, and, if so, what are the most common?

- Would NES participants benefit from, or like, additional follow-up communication from the program after their participation? What communication methods would be effective?

5.2 Methodology

The process evaluation relied on the following tasks (see Section 3 for additional detail):

- in-depth interview with program staff at DEC and DEP;

- A review of secondary materials (i.e., Honeywell Scope of Work, NES marketing materials, NES Program guide, and program evaluations from previous years);

- Telephone survey of program participants

- An analysis of program tracking data.

5.3 Key Findings

5.3.1 Program Participation

The program years 2017 and 2018 were the eighth and ninth years of the NES Program in Duke Energy's North and South Carolina territories. Between June 1st, 2017 and June 30th, 2018, the NES Program teams served 24 neighborhoods in total, 17 in DEC territory and 7 in DEP territory. The NES Program team treated 11,079 DEC and 4,233 DEP customers, 15,312 in total. Figure 5-1 below provides a comparison of program participation over the past 4 years. Overall, staff reached 69% of customers across all neighborhoods served during the 2017-2018 evaluation period.

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Figure 5-1 NES Program Participation 2013-2018
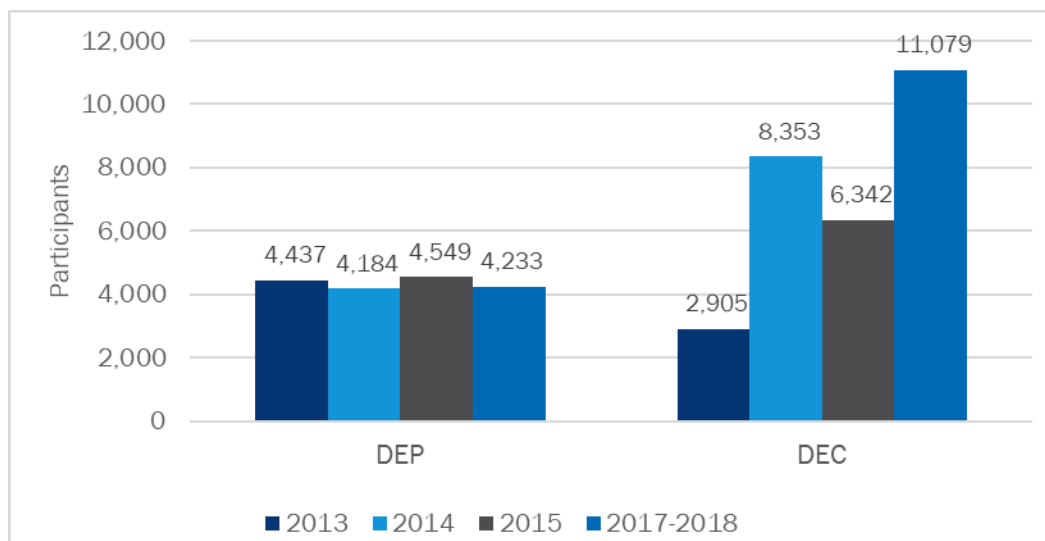
Cross Participation

There were high levels of cross participation in other Duke Energy programs among NES participants from June 1st, 2017 and June 30th, 2018. As shown in Table 5-2 below, 79% of DEP and 83% of DEC participants also participated in another Duke Energy program, most of them prior to having NES measures installed in their homes (67% and 71%, respectively).

Figure 5-2. Cross Participation Before and After NES Participation
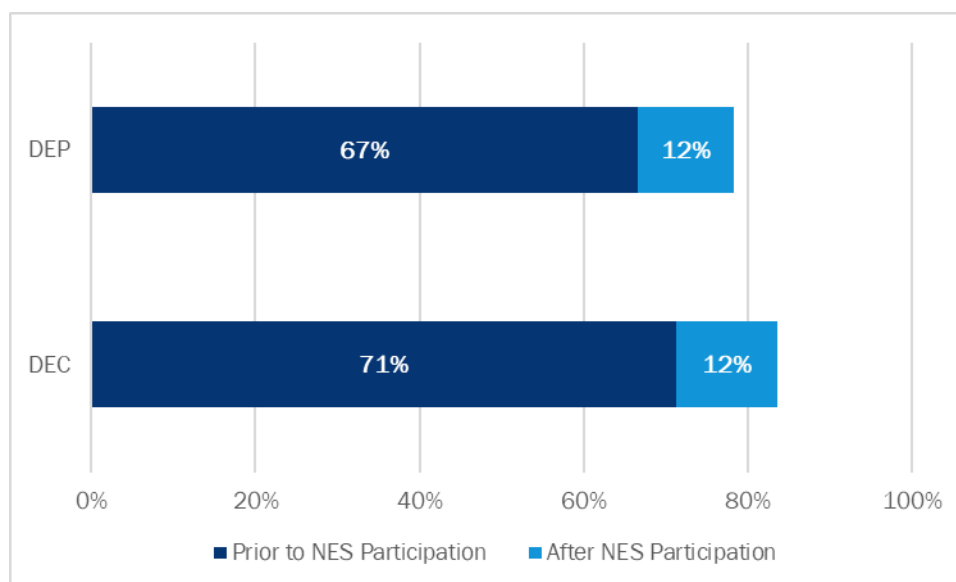
Table 5-1 shows the number of cross participants in other Duke Energy programs. The largest number of DEP cross participants also enrolled in the My Home Energy Report Program, while the largest number of DEC participants also enrolled in the Smart $aver Residential program.

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Table 5-1. Count of NES Cross Participants by Program

Program	DEP	DEC
My Home Energy Report	3,164	1,450
EnergyWise Home	556	0
Single Family Water Measures	320	0
Smart $aver Residential	118	8,546
Home Energy Improvement	92	0
Residential Energy Assessment	64	108
Energy Efficiency Behavior	54	0
Appliance Recycling Program	25	64
Residential EE Products & Services	6	767
Residential Demand Response	0	727
Total Unique Cross Participants	3,315	9,265

5.3.2   Marketing and Outreach

For each neighborhood, Duke program staff and implementation teams conduct both broad and targeted outreach aimed at encouraging program participation and educating communities about energy efficiency. Program teams first send customized introductory letters to neighborhood residents that provide information on the measures that the program offers, the monetary savings that participants can achieve by enrolling, and information about how to participate. The introductory letter also notes any local community organizations that program teams have partnered with and provides information about the community launch event for their neighborhood. In coordination with the implementation teams, program staff conduct a community launch event for each neighborhood, introducing the NES Program, the implementation teams, and showing residents, the types of energy efficiency measures offered through the NES Program. Program teams also send follow up postcards reminding residents about the NES Program and, for those not home when an implementation team knocks on their door, crews leave behind door hangers that provide an option to schedule an appointment to have measures installed.

Figure 5-3 shows participant responses about how they first heard about the NES Program. In both service territories, the most common way that participants heard about the program was though a direct mail or door hanger (DEP-48%, DEC-42%). The second most common method was from a program representative who visited the home (DEP-36%, DEC-39%). These responses indicate that the initial contacts made by program teams are an effective form of outreach.

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Figure 5-3. How Participants First Heard About the NES Program
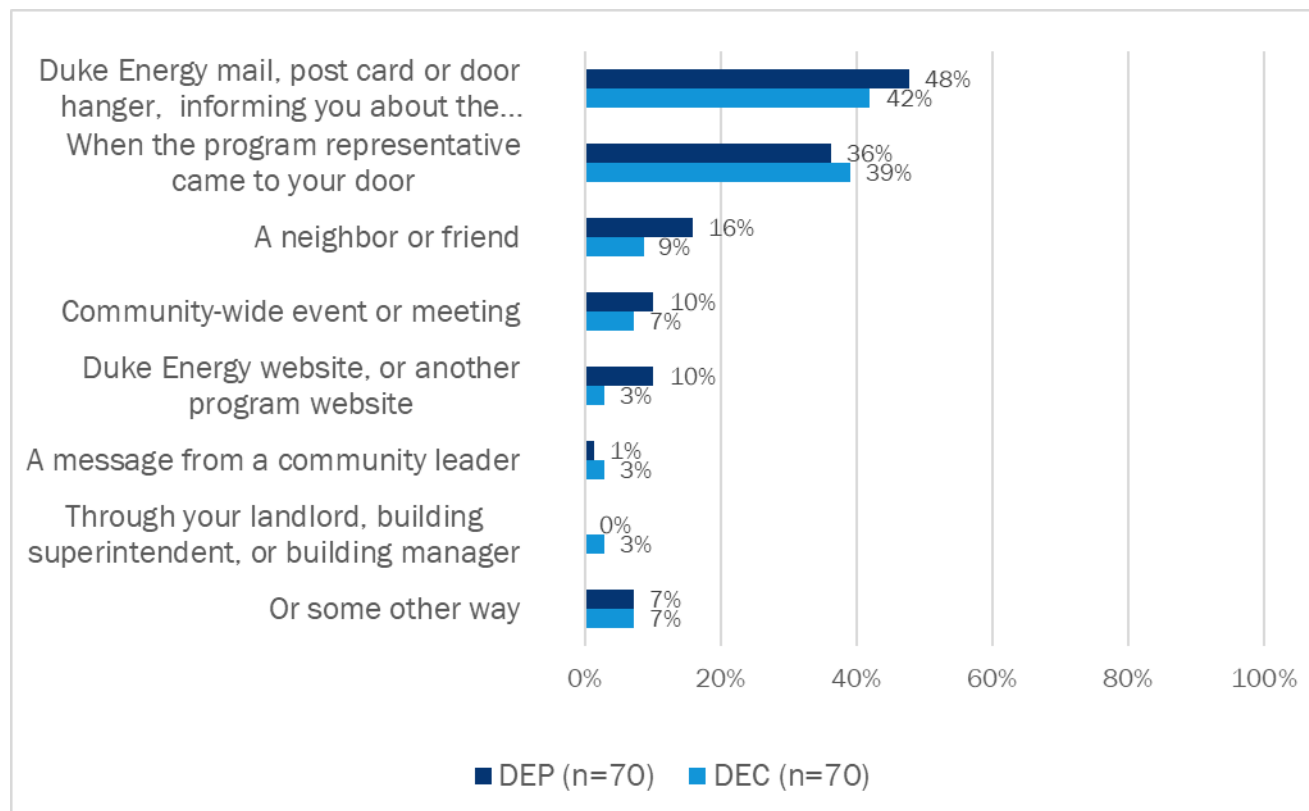
5.3.3 Program Satisfaction

Both DEP and DEC participants are satisfied with all components of the program. As shown in Figure 5-4, 96% of DEP and 98% of DEC participants reported that they were somewhat or very satisfied with the program overall, and 99% of participants from both territories reported that they were somewhat or very satisfied with the equipment they received through the program.

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Figure 5-4 Satisfaction with NES Program and Equipment
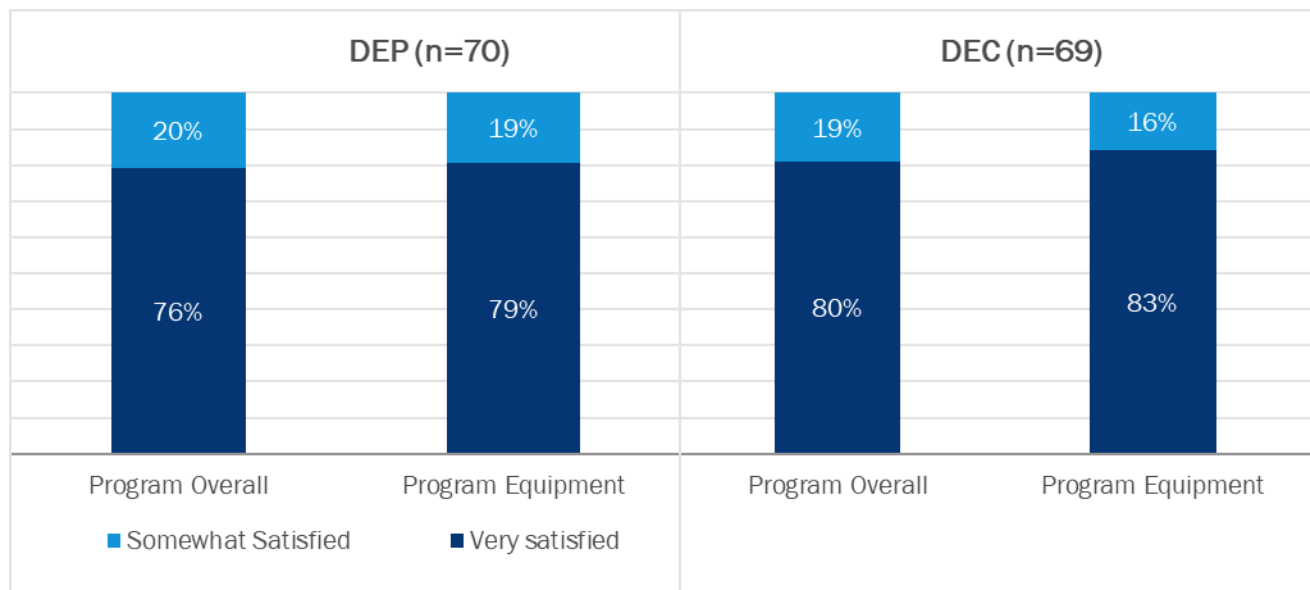
In addition, participants are very satisfied with program representatives, including implementation teams (Figure 5-5). Ninety-nine percent of DEP and 91% of DEC participants reported they were satisfied with their NES Program representatives.

Figure 5-5 Participant Satisfaction with NES Program Representatives
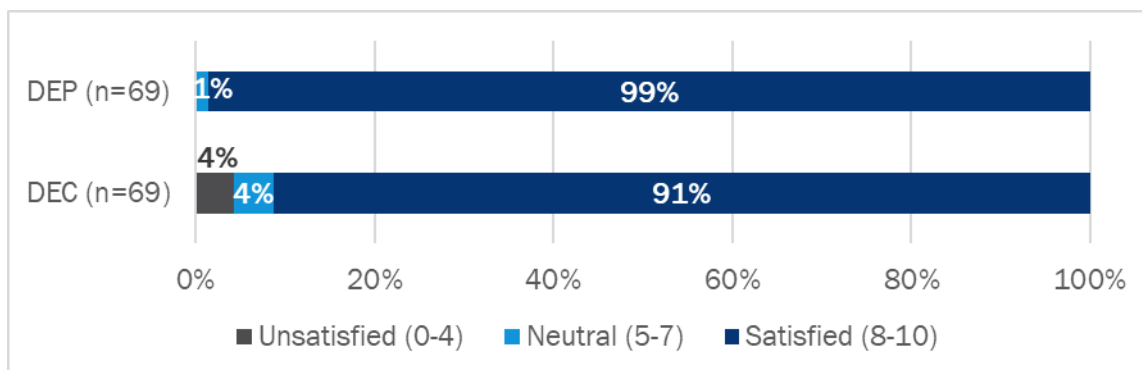
5.3.4 Additional Benefits

An important customer benefit of the NES Program is the energy education that customers receive at the time of home visits. Prior to participation, customers received some information about ways to save energy through mailings and flyers either left at their home or provided at the community launch event. Additionally, at the neighborhood launch event, program staff discuss the energy-saving measures that Duke Energy offers through the NES Program and how each measure saves energy in participants' homes. Implementation teams also provide important education to participants while on site. During measure installation, implementation teams provide more detail on energy saving measures, discuss other ways that participants might change their behavior to save more energy, and answer participant questions. Implementation teams then leave

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behind information to reinforce the energy education, provide other tips for saving energy in their home, and information about other Duke Energy programs that participants may be eligible for.

Eighty-nine percent of DEP and all of DEC participants reported receiving in-person recommendations or energy saving tips from implementation teams. The vast majority of those participants found that information useful in helping them save energy (DEP-94%, DEC-87%). In addition, 99% of DEP participants and 87% of DEC participants said that they received educational materials during their home visit. Of those that received these materials, most found them useful in helping save energy in their homes (DEP-88%, DEC-75%).

Participants across both service territories reported that their knowledge increased after their enrollment in the NES Program. Prior to participation, 70% of DEP participants and 60% of DEC participants reported that they were knowledgeable about ways to save energy in their homes, providing a mean rating of 6.6 (DEP) and 6.5 (DEC) on a scale of 0 to 10, where 0 means "not at all knowledgeable" and 10 means "very knowledgeable." After participation, 96% of DEP participants and 94% of DEC participants reported that they were knowledgeable, providing a mean rating of 9.0 and 8.4, respectively (Figure 5-6).

Figure 5-6 Participant Knowledge of Ways to Save Energy
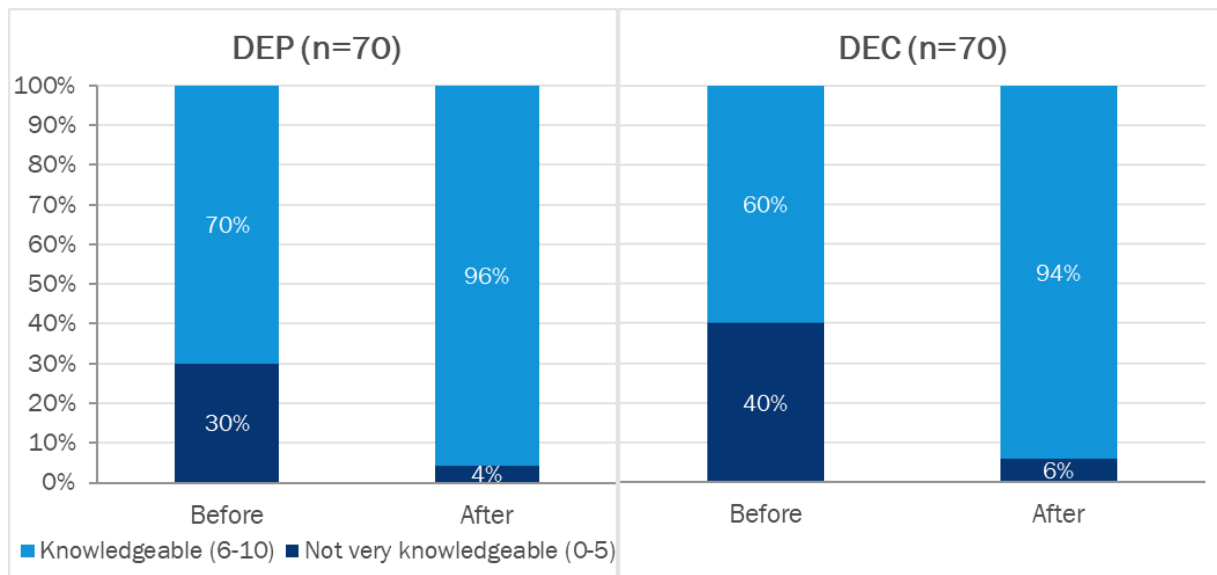
Both DEP and DEC participants are motivated to reduce their energy use. Eighty-eight percent of DEP and 90% of DEC participants were motivated to reduce their energy use after participating in the NES Program (Figure 5-7).

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Figure 5-7 Motivation to Reduce Energy Use after NES Program Participation
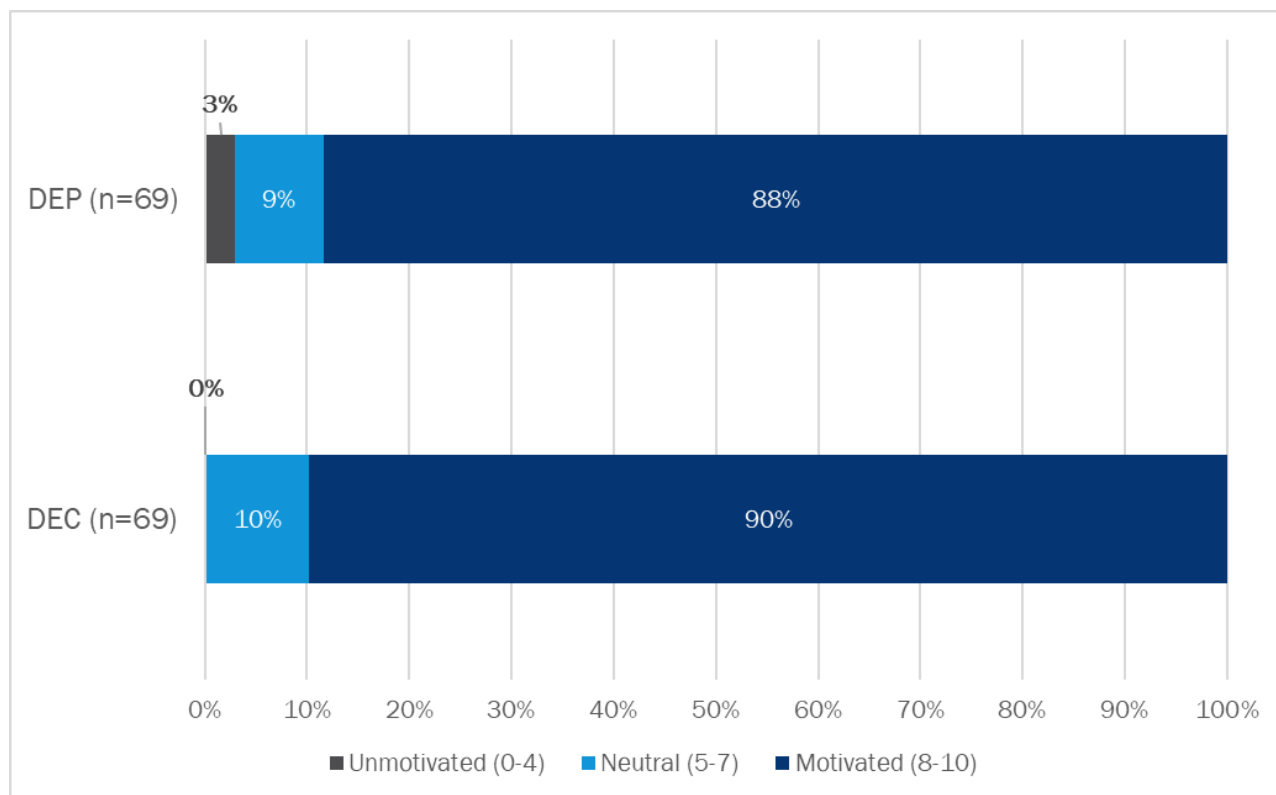
Participants that received the leave behind materials take other actions to save energy in their home. Most frequently, participants reported turning lights off more frequently, keeping doors and windows closed, cleaning their dryer's lint screen, and closing curtains and shades at night (Figure 5-8).

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Figure 5-8 Energy Saving Actions Taken (multiple responses)
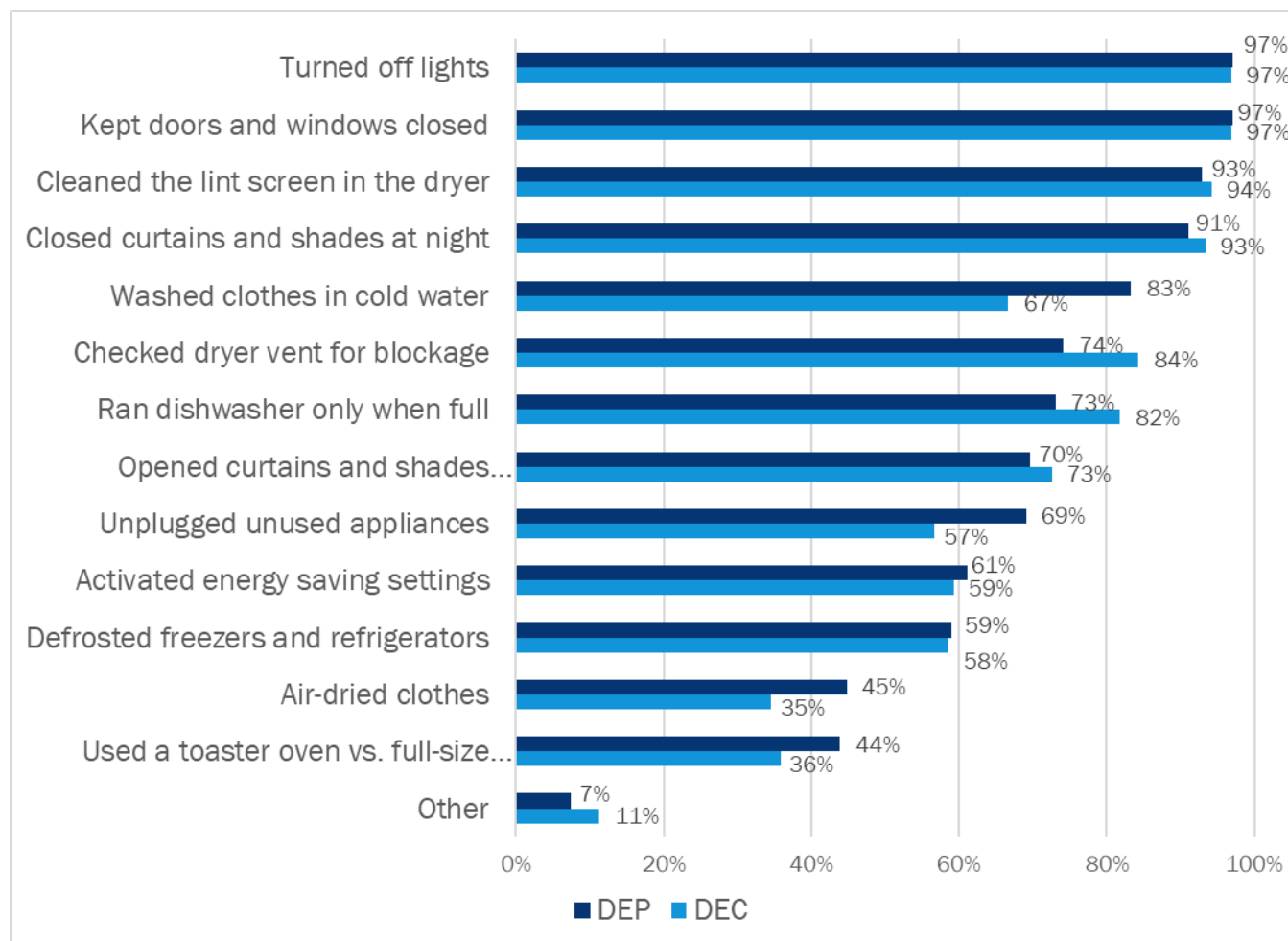
Over half of participants in both service territories reported noticing a decrease in their electric bill since participating in the NES Program (DEP-58%, DEC-57%). Additionally, participants report several non-energy benefits. Notably, 92% of DEP and 84% of DEC participants felt that their home was less drafty, and 86% and 73%, respectively, reported noticing a change in the comfort of their home. Of those who noticed a difference in home comfort, 90% and 80% of DEP and DEC participants, respectively, felt that keeping a comfortable temperature in their home was easier after their NES participation. Table 5-2 lists additional non-energy benefits, and the share of DEP and DEC participants that experienced each.

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Table 5-2 Non-Energy Benefits Reported by Participants

Non-Energy Benefit	DEP		DEC	
	Percent of Participants	n	Percent of Participants	n
I like the light level better in my home	90%	69	86%	64
I feel like I'm doing something good for the environment	95%	65	93%	68
My home is less drafty	92%	64	84%	64
My home is quieter; I hear less noise from the outside	61%	67	51%	63
I have fewer maintenance costs	81%	62	68%	57

5.3.5   Additional Opportunities for Program Savings

One objective of the process evaluation was to determine if there are opportunities for increasing program savings. For example, some income-qualified programs provide energy-efficient replacements for older, inefficient appliances. Further, with the increasing efficiency of existing standard lighting, some programs are offering LEDs and other specialty lighting options.

Lighting

There is limited opportunity for additional savings from lighting measures beyond the LEDs already offered through the NES Program. Twenty-five percent of participants reported that some bulbs were not replaced during their NES installation visit. Figure 5-9 several reasons that participants gave for not having all of their bulbs replaced with program LEDs. Most commonly, participants reported that they had already received the maximum number of LEDs (40%) or that an efficient bulb was already in place (37%). This suggests that, while lighting remains an important component of the NES Program, the potential for additional savings from lighting in the future may be limited as LEDs become more common in the residential market.

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Figure 5-9. Reasons for Not Replacing Bulbs with Program LEDs
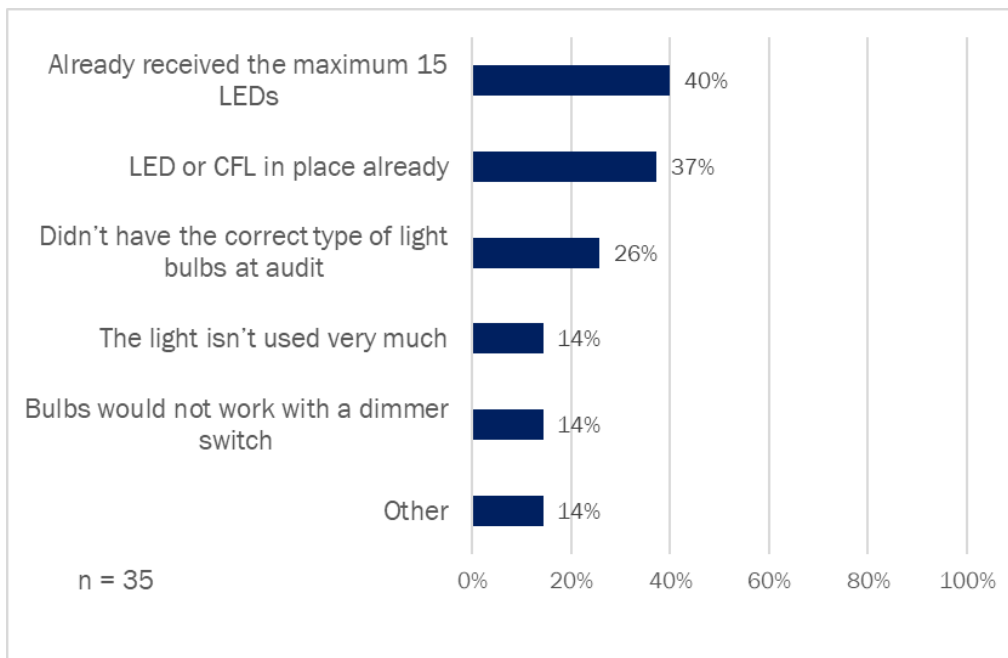
Air Conditioning and Refrigeration

There is also limited opportunity for additional savings from replacing old window air conditioner units and refrigerators. Forty-one percent of participants reported having window air conditioning units in their home, and the majority (67%) were between 1 and 5 years old. Additionally, 43% of participants reported their refrigerator was between 1 and 5 years old. Figure 5-10 shows the age distribution of both appliances in participating households.

Figure 5-10. Window AC and Refrigerator Age Distribution
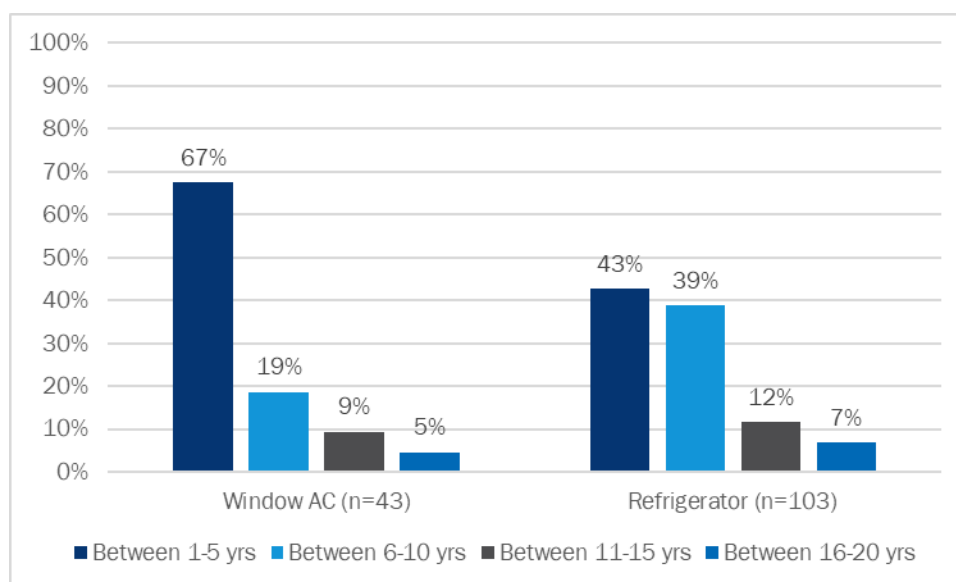
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6. Conclusions and Recommendations

Opinion Dynamics conducted an engineering analysis to estimate gross energy and demand savings for the DEP and DEC NES Programs from June 1st, 2017 through June 30th, 2018. Table 6-1 presents both per household ex post impacts and total program savings.

Table 6-1 Comparison of 2017 Engineering Savings Estimates

Service Territory	Gross Annual Savings per Household			Gross Program Savings		
	Energy (kWh)	Summer Coincident Demand (kW)	Winter Coincident Demand (kW)	Energy (MWh)	Summer Coincident Demand (MW)	Winter Coincident Demand (MW)
DEP	779	0.103	0.101	3,298	0.437	0.428
DEC	676	0.090	0.083	7,449	0.994	0.921

Key findings, which we discuss below, include:

- Per household savings increased for both service territories when compared to engineering estimates in past DEP and DEC evaluations;

- NES participation was strong for this evaluation period and participants are highly satisfied with the program;

- The educational component of the NES Program is effective, and the majority of participants are engaged with the implementation teams during the measure installation visit; and

- NES participants experienced additional non-energy benefits, such as lower energy bills and increased comfort.

Per Household Savings

During this evaluation period, DEP participants saved 779 kWh and DEC participants saved 676 kWh per household, as determined by our engineering analysis. Per household energy savings for this evaluation period were substantially higher than engineering estimates from previous DEP and DEC impact evaluations. Higher savings per household in the 2017-2018 evaluation period were driven, in part, by a larger share of participants with electric space and water heating (Figure 6-1). Given the mix of measures offered through the NES Program, energy savings from domestic hot water and infiltration measures represent a large portion of potential program savings. To realize electric savings from these measures at the household-level, participants need to heat their homes or hot water with electricity. As such, a higher share of participants that heat with electric fuel will yield more energy savings per household.

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Figure 6-1. Share of DEP and DEC Participants with Electric Space and Water Heating
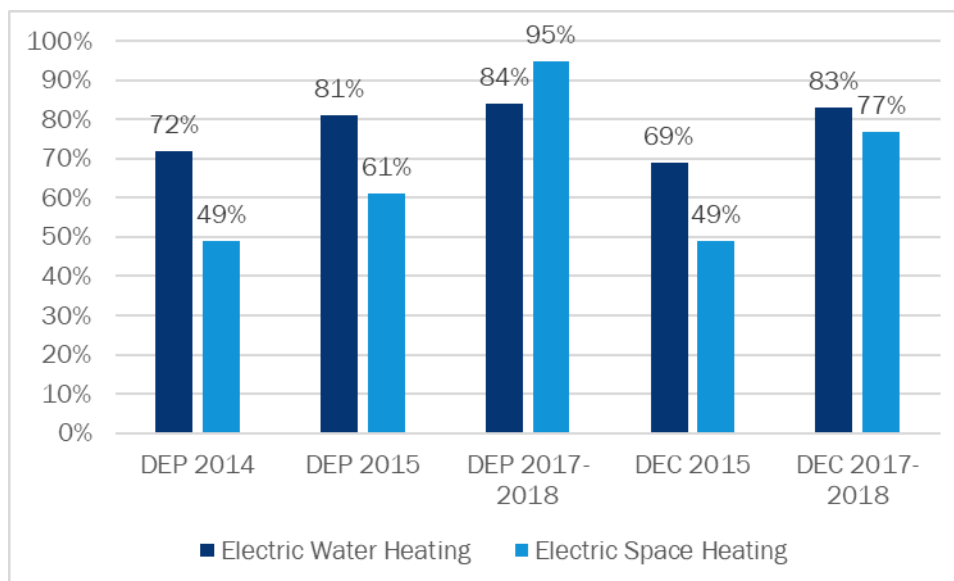
Program Participation and Satisfaction

The program teams achieved strong participation during the 2017-2018 evaluation period. DEP program teams reached 4,233 households (94% of the annual target) and 11,079 DEC households (124% of the annual target). Additionally, across both service territories, program teams reached 69% of households within targeted neighborhoods.

Satisfaction with the NES Program is also very high amongst participants. Seventy-six percent of DEP and 79% of DEC participants were very satisfied with the NES Program, and 80% of DEP and 83% of DEC participants were very satisfied with the equipment they received.

Energy Education

The vast majority (91%) of participants received in-person education and 89% thought that information helped them save energy in their homes. Additionally, participants reported that they were more knowledgeable about ways to save energy in their homes after their NES participation than they were before (70%-DEP and 60% DEC before compared with 96%-DEP and 94% DEC after). As such, NES participants reported taking a range of additional energy saving actions in their homes (e.g., turning off lights more frequently, keeping doors and windows closed, washing clothing in cold water, etc.). See section 5.3.4 for additional details.

Non-Energy Benefits

NES participants reported several non-energy benefits; including less drafty homes (92%-DEP, 84%-DEC), increased comfort (86%-DEP, 73% DEC), and the ability to more easily keep their homes at a comfortable temperature (90%-DEP, 80%-DEC). Additionally, 54% of DEP and 55% of DEC participants reported that their electric bill had gone down after participating in the NES Program.

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6.1   Recommendations

■ **NES program teams should consider including space and water heating fuel types as additional criteria for identifying and selecting neighborhoods for future program years.** As the NES offers a relatively limited set of easy-to-install measures by design, domestic hot water and air infiltration measures will continue to contribute a substantial portion to total program savings. However, energy savings only manifest from those measures in households that heat their homes or their hot water with electricity. To maximize savings per participating household, NES Program staff should consider targeting neighborhoods with higher rates of electric space and water heating.

■ **NES Program staff should continue to emphasize air infiltration measures.** While infiltration measures make an important contribution to overall program energy savings (14% of DEP and DEC participants), NES participants that receive those measures also report other valuable non-energy benefits. Of those that received infiltration measures, 92% of DEP and 84% of DEC participants reported that their home was less drafty and 86% and 73%, respectively, reported noticing a change in the comfort of their home. Of those who noticed a difference in home comfort, 90% of DEP and 80% of DEC felt that keeping a comfortable temperature in their home was easier after their NES participation. Air infiltration measures may be important in driving participant non-energy benefits in the future.

■ **NES Program staff should continue to emphasize the in-person educational component of the program.** The majority of DEC and DEP participants (91%) receive in-person education from implementation teams and 89% find the educational component of the program useful in helping save energy in their homes.. This sort of in-person education can provide a valuable touch point between program representatives and Duke Energy customers, and also encourages various different types of energy-saving behavior change (see Section 5.3.4).

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7.   DEP Summary Form

Neighborhood Energy Saver Program

Completed EMV Fact Sheet

The Neighborhood Energy Saver (NES) program provides a home energy assessment free of cost and installs energy-saving measures in the homes of income-qualified customers living in DEP service territory. During the assessment, program representatives discuss what was installed and provide additional recommendations on ways participants can save energy in their homes.

Date	December 6th, 2019
Region(s)	Duke Energy Progress, North Carolina and South Carolina
Evaluation Period	June 1st, 2017-June 30th, 2018
MWh Savings	3,298
Coincident MW Impact	0.437 (Summer) 0.428 (Winter)
Per Participant kWh Savings	779
Measure Life	Not evaluated, so remains unchanged at 7 years
Net-to-Gross Ratio	N/A
Process Evaluation	Yes
Previous Evaluation(s)	January 2017, January 2016

Evaluation Methodology

The evaluation team performed an engineering analysis to estimate ex-pot energy and demand savings. The consisted of (1) a review of deemed savings estimates using an engineering analysis of savings assumptions and calculations and (2) verification of measure installation and persistence through a participant survey. To determine total program savings, the evaluation team applied (1) measure-specific per-unit savings estimates to participants who both received each measure and had the appropriate mix of fuel and equipment and (2) measure-specific ISRs.

Impact Evaluation Details

- Neighborhoods in DEP service territory where at least 50% of residential customers are at or below 200% of the federal poverty guidelines are eligible to participate in the NES Program.

- The engineering team developed updated deemed savings values for individual measures.

- The evaluation team developed measure-specific in-service rates and made adjustments to per-unit savings based on the share of measure in operation at the time of the survey.

- Applied adjusted per-unit savings to each participant and multiplied by the quantity received. The team only applied savings for measure dependent on certain fuel types or other parameters (i.e., domestic hot water, air infiltration, and HVAC filters) to the applicable households.

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8.   DEC Summary Form

Neighborhood Energy Saver Program

Completed EMV Fact Sheet

The Neighborhood Energy Saver (NES) program provides a home energy assessment free of cost and installs energy-saving measures in the homes of income-qualified customers living in DEC service territory. During the assessment, program representatives discuss what was installed and provide additional recommendations on ways participants can save energy in their homes.

Date	December 6th, 2019
Region(s)	Duke Energy Carolinas, North Carolina and South Carolina
Evaluation Period	June 1st, 2017-June 30th, 2018
MWh Savings	7,489
Coincident MW Impact	0.994 (Summer) 0.921 (Winter)
Per Participant kWh Savings	676
Measure Life	Not evaluated, so remains unchanged at 7 years
Net-to-Gross Ratio	N/A
Process Evaluation	Yes
Previous Evaluation(s)	December 2016

Evaluation Methodology

The evaluation team performed an engineering analysis to estimate ex-pot energy and demand savings. The consisted of (1) a review of deemed savings estimates using an engineering analysis of savings assumptions and calculations and (2) verification of measure installation and persistence through a participant survey. To determine total program savings, the evaluation team applied (1) measure-specific per-unit savings estimates to participants who both received each measure and had the appropriate mix of fuel and equipment and (2) measure-specific ISRs.

Impact Evaluation Details

- Neighborhoods in DEC service territory where at least 50% of residential customers are at or below 200% of the federal poverty guidelines are eligible to participate in the NES Program.

- The engineering team developed updated deemed savings values for individual measures.

- The evaluation team developed measure-specific in-service rates and made adjustments to per-unit savings based on the share of measure in operation at the time of the survey.

Applied adjusted per-unit savings to each participant and multiplied by the quantity received. The team only applied savings for measure dependent on certain fuel types or other parameters (i.e., domestic hot water, air infiltration, and HVAC filters) to the applicable households.

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9.   DSMore Table

The embedded Excel spreadsheet below contains inputs for Duke Energy Analytics. Per-household savings values in the spreadsheet are based on the engineering estimates reported above.

DSMore_DEP-DEC
NES Program.xlsx

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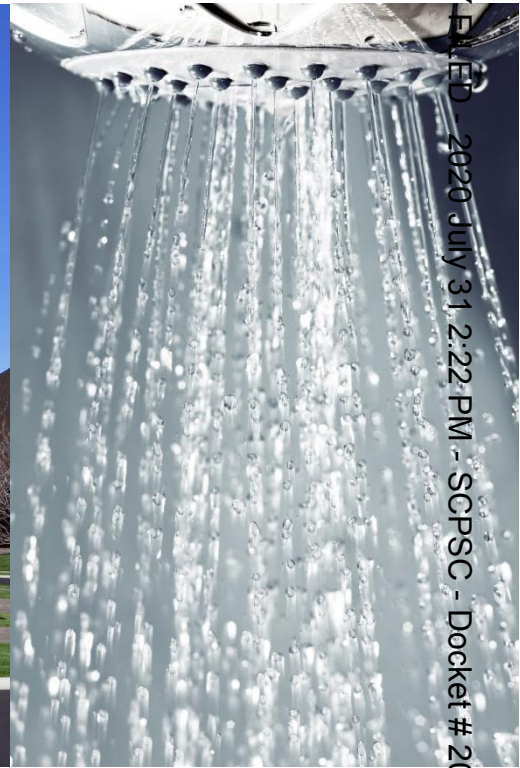
Save Energy and Water Kits 2018 – 2019 Evaluation Report

Submitted to Duke Energy Carolinas and Progress by Nexant in partnership with Opinion Dynamics

April 23rd, 2020

Principal authors:

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1 Executive Summary

1.1 Program Summary

The Save Energy and Water Kit Program (SEWKP) is a Duke Energy offering that provides free energy saving and water efficiency kits to pre-selected households in the Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP) jurisdictions. The kits include aerators for kitchen and bathroom sink faucets, showerheads, and insulating water heater pipe tape.

1.2 Evaluation Objectives and Results

This report presents the results and findings of evaluation activities for DEC and DEP SEWKP conducted by the evaluation team, collectively Nexant Inc. and our subcontracting partner Opinion Dynamics, for the program year of September 2018 – August 2019.

1.2.1 Impact Evaluation

The evaluation team conducted the evaluation as detailed in this report to estimate energy and demand savings attributable to the programs. The evaluation was divided into two research areas - to determine gross savings and net savings (or impacts). Gross impacts are energy and demand savings estimated at a participant's home that are the direct result of the homeowner's installation of the measures included in the SEWKP kit. Net impacts reflect the degree to which the gross savings are a result of the program efforts and funds.

Table 1-1, Table 1-2, and Table 1-3 present the summarized findings of the impact evaluation for the DEC jurisdiction. All totals in Table 1-1, excluding the population, are weighted averages based on the 2018-2019 evaluation sample and represent expected savings from the average participant.

Table 1-1: DEC Energy Savings per Kit

Kit Size	Population	Reported Energy (kWh)	Energy Realization Rate	Gross Verified Energy (kWh)
Small	26,364	333	145%	482
Medium	17,750	564	125%	706
Program Total	**44,114**	**426**	**134%**	**572**

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Table 1-2: DEC Demand Savings per Kit

Kit Size	Summer Demand (kW)			Winter Demand (kW)		
	Reported	Realization Rate	Gross Verified	Reported	Realization Rate	Gross Verified
Small	0.114	36%	0.042	0.073	168%	0.123
Medium	0.188	32%	0.061	0.129	148%	0.191
Program Total	**0.144**	**34%**	**0.049**	**0.096**	**157%**	**0.150**

Table 1-3: DEC Program Level Savings

Measurement	Population	Reported	Realization Rate	Gross Verified
Energy (kWh)		18,797,312	134%	25,232,766
Summer Demand (kW)	44,114	6,342	34%	2,169
Winter Demand (kW)		4,217	157%	6,624

The portion of gross verified savings by measure type are presented in Figure 1-1. Per unit energy and demand savings by measure and the program net to gross ratio, with free ridership and spillover components, are presented in Table 1-4.

Figure 1-1: DEC Portion of Program Verified Savings by Measure

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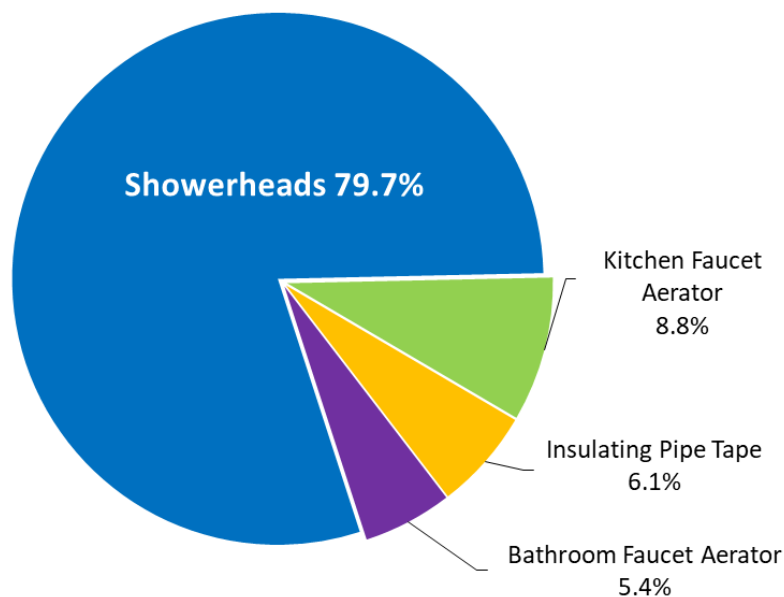
Table 1-4: DEC Verified Impacts by Measure

Measure	Energy Savings per unit (kWh)	Summer Demand Savings per unit (kW)	Winter Demand Savings per unit (kW)	Free Ridership	Spillover	Net to Gross Ratio
Low-flow Showerhead	324.9	0.0276	0.0989			
Low-flow Kitchen Aerator	50.2	0.0035	0.0040			
Low-flow Bathroom Aerator	15.5	0.0015	0.0017	9.3%	12.6%	103.3%
Insulating Pipe Tape*	7.0	0.0008	0.0008			

* Savings for pipe tape is a per linear foot measurement

Table 1-5, Table 1-6, and Table 1-7 present the summarized findings of the impact evaluation for the DEP jurisdiction.

Table 1-5: DEP Energy Savings per Kit

Kit Size	Population	Reported Energy (kWh)	Energy Realization Rate	Gross Verified Energy (kWh)
Small	14,479	428	118%	506
Medium	11,633	738	101%	748
Program Total	**26,112**	**566**	**108%**	**614**

Table 1-6: DEP Demand Savings per Kit

Kit Size	Summer Demand (kW)			Winter Demand (kW)		
	Reported	Realization Rate	Gross Verified	Reported	Realization Rate	Gross Verified
Small	0.143	30%	0.044	0.107	119%	0.127
Medium	0.242	26%	0.064	0.191	105%	0.200
Program Total	**0.187**	**28%**	**0.053**	**0.144**	**111%**	**0.160**

Table 1-7: DEP Program Level Savings

Measurement	Population	Reported	Realization Rate	Gross Verified
Energy (kWh)		14,785,941	108%	16,025,692
Summer Demand (kW)	26,112	4,886	28%	1,376
Winter Demand (kW)		3,761	111%	4,166

The portion of gross verified savings by measure type are presented in Figure 1-2. Per unit energy and demand savings by measure and program net to gross ratio, with free ridership and spillover components, are presented in Table 1-8.

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Figure 1-2: DEP Portion of Program Verified Savings by Measure
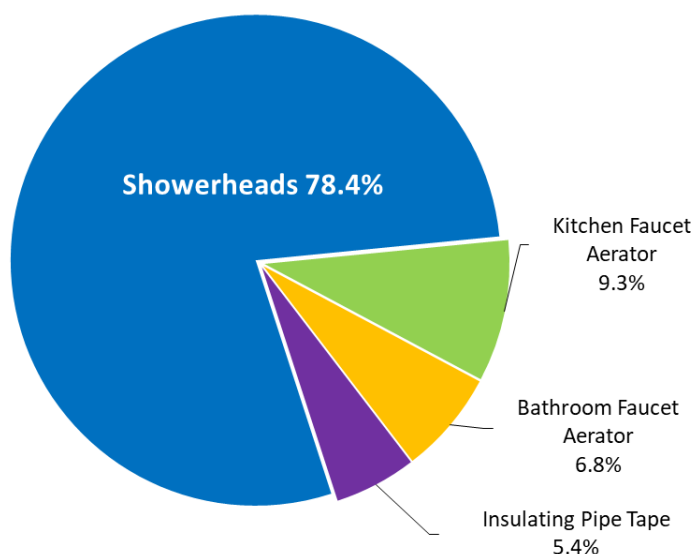
Table 1-8: DEP Verified Impacts by Measure

Measure	Energy Savings per unit (kWh)	Summer Demand Savings per unit (kW)	Winter Demand Savings per unit (kW)	Free Ridership	Spillover	Net to Gross Ratio
Low-flow Showerhead	333.1	0.0283	0.1014	8.0%	17.5%	109.5%
Low-flow Kitchen Aerator	57.3	0.0040	0.0045			
Low-flow Bathroom Aerator	20.9	0.0020	0.0023			
Insulating Pipe Tape*	6.9	0.0008	0.0008			

* Savings for pipe tape is a per linear foot measurement

1.2.2 Process Evaluation

The process evaluation assessed opportunities for improving the program's design and delivery in the DEC and DEP service territories. It specifically documented participant experiences by exploring participating household feedback and the extent to which the kits effectively motivate households to save energy.

The evaluation team conducted telephone and web surveys with households that received a kit (DEC n=320; DEP n=343). The team also conducted in-depth interviews with the Duke Program Team and kit provider staff.

Program Successes
The 2018-2019 DEP/DEC SEWKP evaluation found successes in the following areas:

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Most participants are satisfied with kit items and report high satisfaction with the overall program. Less than 10% of participants in each jurisdiction reported dissatisfaction with any specific measure they installed, and the vast majority reported they were highly satisfied with the overall program (83% DEC; 86% DEP).

Kit instructions are perceived as highly helpful among SEWKP participants. Eighty-five percent of participants in each jurisdiction said they read the instructional insert from their kit that offers detailed instructions on self-installing the measures, and most of them said the instructions were very helpful (81% DEC; 84% DEP). These paper instructions are likely sufficient for most participants, as most reported high satisfaction and very few took advantage of the toll-free hotline.

The updated propensity model scoring used to select households is effective in identifying homes with electric water heaters. Customers with electric water heaters are able to realize electric savings from water-saving equipment. Thanks at least in part to propensity model updates, the percentage of participants with electric water heaters increased in both jurisdictions from less than 80% in 2017 to nearly 90% in 2019.

The program influenced households to install kit measures. Most participating households installed at least one measure from the kit (79% DEC; 83% DEP), and the vast majority of measures, once installed, remained installed (92% DEC; 91% DEP). Participants were highly influenced by the program to install kit measures, as demonstrated by low free ridership rates. In addition, more than one-third of participants in each jurisdiction reported purchasing and installing additional energy efficiency measures since receiving their kit (37% DEC; 35% DEP).

Program Challenges
The 2018-2019 DEC and DEP SEWKP evaluations found some challenges in the following areas:

Insulating pipe tape is the least popular measure. Pipe tape was the least installed measure type, with just over one-third of participants (36%) reportedly installing it in each jurisdiction.

Low water pressure is a significant contributor to dissatisfaction and uninstalls. Complaints of excessively low water pressure were the primary drivers of dissatisfaction and uninstallation among a relatively small number of participants who were dissatisfied with or uninstalled any items.

Increased penetration and saturation of measures included in the kits could contribute to lower installation rates in the future. Among participants who had yet to install at least one measure and had no immediate plans to do so, more than 20% in each jurisdiction indicated they already had at least one of the efficient measures installed.

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1.3 Evaluation Conclusions and Recommendations

The evaluation findings led to the following conclusions and recommendations for the program.

Conclusion 1: The program model is highly successful: it leverages low-cost measures to foster energy savings that would not have happened otherwise. Duke Energy's easy process for requesting and receiving a kit with free energy and water-saving items motivated thousands of customers to request and install energy saving measures in their home during the evaluation period. Most participants installed at least one measure from the kit, relatively few measures get uninstalled, and many participants reported installing additional energy saving items since receiving the kit. The majority of participants said they would not have installed any of the items on their own, as represented by low free ridership rates, and the program is reaching a diverse range of customers in terms of household characteristics and demographics.

>   **Recommendation**: Continue using SEWKP to encourage Duke Energy customers to save energy and water.

Conclusion 2: The water saving measures' low flow water pressure results in some minor dissatisfaction and uninstallation issues. Complaints of excessively low water pressure were the primary drivers of water-saving measure dissatisfaction and uninstallation. However, only a minority of participants were dissatisfied with or uninstalled any items.

>   **Recommendation**: Monitor how showerhead upgrades affect satisfaction and uninstallation rates going forward.

Conclusion 3: Recent program improvements have been largely successful. Updates to the propensity model contributed to an increase in the percentage of participants that have electric water heaters from less than 80% in 2017 to nearly 90% in 2019 (from 70% to 88% for the DEC program and from 79% to 89% for the DEP program). The new instructional materials provided with the kits also appear to denote a significant improvement from the prior instructions. Recent participants rated the instructions as considerably more helpful than participants in the last evaluated program year: the percentage of customers who rated instructions as "very helpful" increased since 2017 (from 70% to 81% among DEC participants and 80% to 84% among DEP participants).

Conclusion 4: Increased penetration and saturation of measures included in the kits may limit installation rates going forward. Among participants who had yet to install measures and had no immediate plans to do so, more than 20% indicated they already had at least one of the efficient measures installed. For insulating pipe tape, more than 30% of those without plans to install the measure reported they already had some installed (34% for DEC and 32% for DEP). These rates were nearly as high for showerheads, for which 32% of DEC respondents and 25% of DEP respondents with no plans to install indicated that they already an efficient one installed.

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Recommendation: Monitor installation rates going forward and consider excluding measures that show high rates of prior ownership.

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2   Introduction and Program Description

2.1   Program Description

2.1.1   Overview

The Save Energy and Water Kit Program (SEWKP) is a Duke Energy program that provides free energy and water efficiency kits to pre-selected households in Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP) territories. The kits include low-flow aerators for kitchen and bathroom sink faucets, low-flow showerheads, and insulating water heater pipe tape.

2.1.2   Energy Efficiency Kit Measures

Table 2-1 lists the kit's contents included in the evaluation scope. There are two kit sizes, which dictate the number of showerheads and bathroom aerators the participant receives. In addition to the measures below, the kit includes plumbing tape, a rubber gasket opener to remove old aerators and showerheads, and an instructional insert that has detailed installation instructions. Duke Energy has additional installation instruction information available on their website.

Table 2-1: Kit Measures and Quantity

Measures	Small Kit	Medium Kit
Low-flow Showerhead (1.5 gpm)	1	2
Low-flow Bathroom Faucet Aerator (1.0 gpm)	2	2
Low-flow Kitchen Faucet Aerator (1.0 gpm)	1	1
Insulating Pipe Tape (up to 10' of coverage)	1	1

2.2   Program Implementation

2.2.1   Participant Identification and Recruitment

Every month Duke Energy's internal analytics department identifies households to recruit into the program. They look through customer accounts for single family electric-only accounts that have not participated in SEWKP or any other programs with similar measures (specifically, the Energy Efficiency Education in Schools and Home Energy House Call programs). Pre-selected households are then assigned either a small or medium kit based on household square footage. Next, Duke Energy approaches these customers through either emails, if the pre-selected customer has an email address on file, or business reply cards (BRC). Simultaneously, Duke Energy sends the implementer – Energy Federation, Inc. (EFI) – a list of pre-selected accounts that received an offer to participate in the SEWKP that month. Email messages provide a link for the customer to join the program and households that receive the BRC simply detach the reply

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form and put it back in the mail (postage is pre-paid). Alternatively, customers may also call a toll free number, provided on the email or BRC, to confirm eligibility and request their free kit. EFI then ships the appropriate kit (small or medium) to registered households.

2.2.2 Participation

For the defined evaluation period of September 1st, 2018 through August 31st, 2019, the program recorded a total of 49,353 kit recipients in DEC and 10.6% of our sample stated they did not remember receiving the kit. The program population was reduced by 10.6% to 44,114 for the evaluated estimate of kit participants. For DEP the program reported 27,939 kit recipients with 6.5% of our sample stated they did not remember receiving the kit; leading to an evaluated estimate of 26,112 DEP participants.

2.3 Key Research Objectives

Over-arching project goals will follow the definition of impact evaluation established in the "Model Energy-Efficiency Program Impact Evaluation Guide – A Resource of the National Action Plan for Energy Efficiency," November 2007:

> *"Evaluation is the process of determining and documenting the results, benefits, and lessons learned from an energy-efficiency program. Evaluation results can be used in planning future programs and determining the value and potential of a portfolio of energy-efficiency programs in an integrated resource planning process. It can also be used in retrospectively determining the performance (and resulting payments, incentives, or penalties) of contractors and administrators responsible for implementing efficiency programs".*

Evaluation has two key objectives:

1) To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.

2) To help understand why those effects occurred and identify ways to improve the program.

2.3.1 Impact

As part of evaluation planning, the evaluation team outlined the following activities to assess the impacts of the DEC-DEP SEWKP:

- Quantify accurate and supportable energy (kWh) and demand (kW) savings for energy efficient measures implemented in participants' homes;
- Assess the rate of free riders from the participants' perspective and determine spillover effects;
- Benchmark verified measure-level energy impacts to applicable technical reference manual(s) and other Duke-similar programs in other jurisdictions.

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2.3.2 Process

The process evaluation assessed opportunities for improving the design and delivery of the program in both DEC and DEP service territories. It specifically documented participant experiences by investigating participant responses to the energy efficiency kits and the extent to which the kits effectively motivate households to save energy and water.

The evaluation team assessed several elements of the program delivery and customer experience, including:

Motivation:
- What motivated participants to request and install the measures in the kit?
- In what ways, if any, did the program motivate participants to adopt new energy and water saving behaviors?

Program experience and satisfaction:
- How satisfied are participants with the overall program experience and kit items in terms of ease of use and measure quality?

Challenges and opportunities for improvement:
- Are there any inefficiencies or challenges with the delivery of the program?
- Are there any measures that have particularly low installation rates? If so, why?
- Are there any measures that have particularly high uninstallation rates? If so, why?

Participant household characteristics:
- What are demographic characteristics of those who received the kits?

2.4 Evaluation Overview

The evaluation team divided its approach into key tasks to meet the goals outlined:

- **Task 1 –** Develop and manage evaluation work plan to describe the processes that will be followed to complete the evaluation tasks outlined in this project;
- **Task 2 –** Conduct a process review to determine how successfully the programs are being delivered to participants and to identify opportunities for improvement;
- **Task 3 –** Verify gross and net energy and peak demand savings resulting from SEWKP through verification activities of a sample of 2018-2019 program participants.

2.4.1 Impact Evaluation

The primary determinants of impact evaluation costs are the sample size and the level of rigor employed in collecting the data used in the impact analysis. The accuracy of the study findings is in turn dependent on these parameters. Techniques that we used to conduct our evaluation,

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measurement, and verification (EM&V) activities, and to meet the goals for this evaluation, included telephone and web-based surveys with program participants, best practice review, and interviews with implementation and program staff.

Figure 2-1 demonstrates the principal evaluation team steps organized through planning, core evaluation activities, and final reporting.

Figure 2-1: Impact Evaluation Process
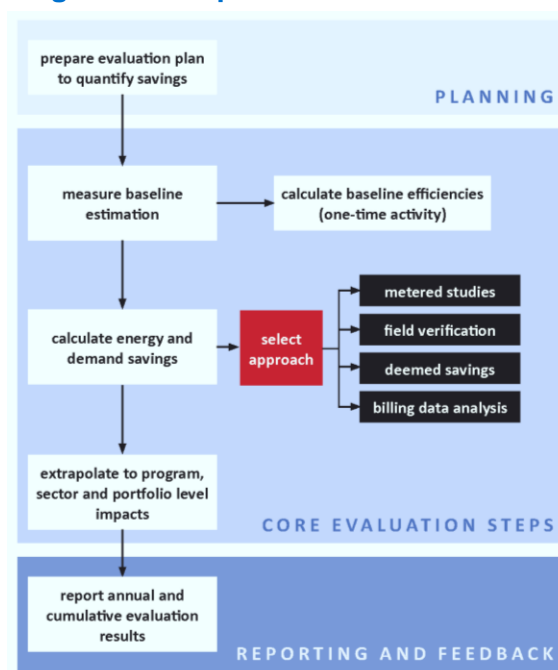
The evaluation is generally comprised of the following steps, which are described in further detail throughout this report:

- **Participant Surveys:** The file review for all sampled and reviewed program participation concluded with a telephone and/or web-based survey with the participants. Table 2-2 below summarizes the number of surveys completed. The samples were drawn to meet a 90% confidence and 10% precision level based upon the expected and actual significance (or magnitude) of program participation, the level of certainty of savings, and the variety of measures.

- **Calculate Impacts:** Data collected via surveys enabled the evaluation team to calculate gross verified energy and demand savings for each measure.

- **Estimate Net Savings**: Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and incentives. The evaluation team estimated free-ridership and spillover based on self-report methods through surveys with program participants. The ratio of net verified savings to gross verified savings is the net-to-gross ratio as an adjustment factor to the reported savings.

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2.4.2 Process Evaluation

Process evaluation examines and documents:

- Program operations
- Stakeholder satisfaction
- Opportunities to improve the efficiency and effectiveness of program delivery

To satisfy the evaluation, measurement, and verification (EM&V) objectives for this research effort, the evaluation team reviewed program documents and conducted telephone and web surveys with participating households who received a kit. The team also held in-depth interviews (IDI) with utility and implementation staff. Table 2-2 provides a summary of the activities the evaluation team conducted as part of the DEC (Table 2-2) and DEP (Table 2-3) SEWKP process and impact evaluations.

Table 2-2: DEC SEWKP Summary of Evaluation Activities

Target Group	Population	Sample	Confidence /Precision	Method
Impact Activities				
DEC Participants	49,353	320	90% ± 4.6%	Telephone/Web Survey
Process Activities				
DEC Participants	49,353	320	90% ± 4.6%	Telephone/Web Survey
Duke Energy Program Staff	n/a	1	n/a	Telephone IDI
Implementer Staff: EFI	n/a	1	n/a	Telephone IDI

Table 2-3: DEP SEWKP Summary of Evaluation Activities

Target Group	Population	Sample	Confidence /Precision	Method
Impact Activities				
DEP Participants	27,939	343	90% ± 4.5%	Telephone/Web Survey
Process Activities				
DEP Participants	27,939	343	90% ± 4.5 %	Telephone/Web Survey
Duke Energy Program Staff	n/a	1	n/a	Telephone IDI
Implementer Staff: EFI	n/a	1	n/a	Telephone IDI

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3 Impact Evaluation

3.1 Methodology

The evaluation team's impact analysis focused on the energy and demand savings attributable to the SEWKP for the period of September 2018 through August 2019. The evaluation was divided into two research areas: to determine gross savings and net savings (or impacts). Gross impacts are energy and demand savings estimated at a participant's home that are the direct result of the homeowner's installation of a measure included in the program-provided energy saving kit. Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and funds. The evaluation team verified energy and demand savings attributable to the program by conducting the following impact evaluation activities:

- Review of DEC and DEP participant database.

- Completion of telephone and web-based surveys to verify key inputs into savings calculations.

- Estimation of gross verified savings using primary data collected from participants.

- Comparison of the gross-verified savings to program-evaluated results to determine kit-level realization rates.

- Application of attribution survey data to estimate net-to-gross ratios and net-verified savings at the program level.

3.2 Sampling Plan and Achievement

To provide representative results and meet program evaluation goals, a sampling plan was created to guide all evaluation activity. A random sample was created to target 90/10 confidence and precision at the program level assuming a coefficient of variation (C_v) equal to 0.5.

3.2.1 Sampling

After reviewing the program database, we identified populations of 49,353 (DEC) and 27,939 (DEP) participants within our defined evaluation period. Based on this population, the evaluation team established sub-sample frames for phone and web-based survey administration. Customers who were flagged as "do not contact" in the participation database were excluded from the sample frame. As illustrated in Table 3-1 below, we completed 320 (DEC) and 343 (DEP) surveys among program participants between October 14th and 28th, 2019. This sample size resulted in a precision of ±4.6 (DEC) and ±4.5 (DEP) at a 90% confidence interval.

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Table 3-1: DEC-DEP Impact Sampling

Jurisdiction	Survey Mode	Sample Frame	Sampled Participants	Achieved Precision at 90% Confidence
Carolinas	Phone	1,499	70	90% ± 4.6%
	Web-based	2,000	250	
	Total	**3,499**	**320**	
Progress	Phone	1,591	70	90% ± 4.5%
	Web-based	2,000	273	
	Total	**3,591**	**343**	

3.3 Description of Analysis

3.3.1 Telephone and web-based surveys

The evaluation team performed telephone and web-based surveys to gather key pieces of information used in the savings calculations. Results of the completed surveys were used to inform our program-wide assumptions as detailed in Table 3-2.

Table 3-2: Participant Data Collected and Used for Analysis

Measure	Data Collected	Assumption
Showerhead Bathroom Faucet Aerator Kitchen Faucet Aerator	Units Installed	In-Service Rate
	Units Later Removed	
	Hot Water Fuel Type	% Electric DHW
	Frequency of Showers	Hot Water Consumption
	Duration of Showers	
Insulating Pipe Tape	Pipe Tape Used	In-Service Rate
	Pipe Tape Removed	
	Hot Water Fuel Type	% Electric DHW
	Length of Insulated Pipe	Pipe Length

3.3.2 In-Service Rate

The in-service rate (ISR) represents the ratio of equipment installed and operable to the total pieces of equipment distributed and eligible for installation. For example, if 15 telephone surveys were completed for customers receiving 1 bathroom aerator each, and five customers reported to still have the aerator installed and operable, the ISR for this measure would be five out of 15 or 33%. In some instances equipment was installed, but may have been removed later due to homeowner preferences. In these cases the equipment is no longer operable and therefore contributes negatively to the ISR. In-service rates for each measure from all eligible survey respondents are detailed in Table 3-3.

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Table 3-3: DEC-DEP SEWKP Sample In-Service Rates

Jurisdiction	Measure	Distributed	Installed	Removed	ISR
Carolinas	Showerhead	436	244	24	50%
	Kitchen Faucet Aerator	320	142	17	39%
	Insulating Pipe Tape*	320	115	1	36%
	Bathroom Faucet Aerator	640	202	10	30%
Progress	Showerhead	481	278	31	51%
	Kitchen Faucet Aerator	343	159	15	42%
	Bathroom Faucet Aerator	686	270	11	38%
	Insulating Pipe Tape*	343	124	4	35%

*Quantity of pipe tape packages

In-service rates for all measures in the Carolinas jurisdiction (Figure 3-1) are greater than, or in-line with the, verified rates from the previous evaluation.[1]

Figure 3-1: DEC Equipment In-Service Rates
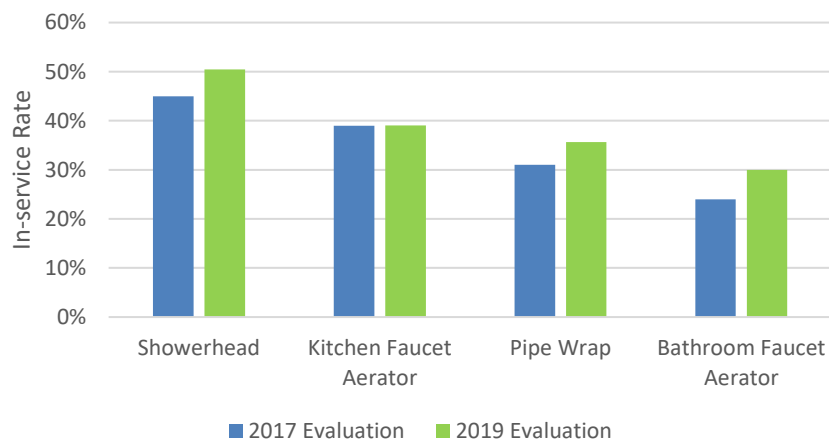
For the Progress jurisdiction (Figure 3-2) in-service rates for bathroom faucet aerators increased by 10% driven by a program change that reduced the number of bathroom faucet aerators provided through the medium kit from four to two. This evaluation (along with the previous 2016-2017 evaluation) has shown measure level in-service rates go down as the number of identical kit measures increases. Removing these items with low in-service rates increased the per unit savings attributed to bathroom faucet aerators. All other measure have similar in-service rates to the 2017 evaluation.

[1] Save Energy and Water Kits 2016 Program Year Evaluation Report, Novemver 29th, 2017

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Figure 3-2: DEP Equipment In-Service Rates
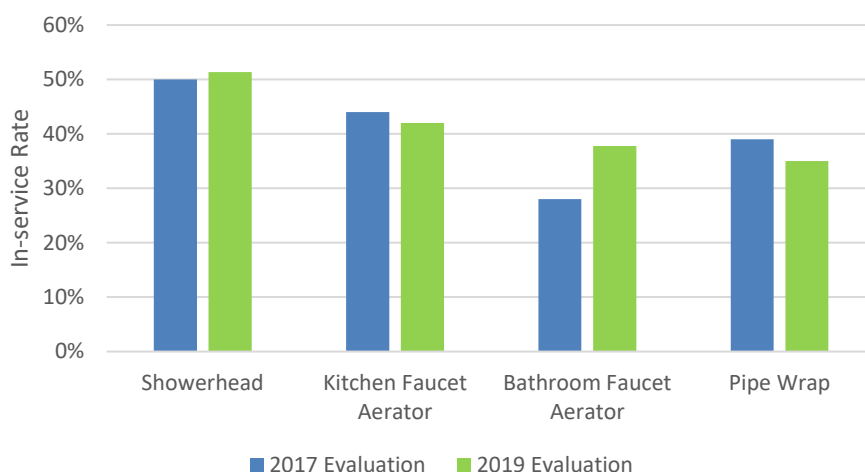
3.3.3 Kit Measure Savings

The next section of the evaluation report provides a summary of the algorithms used to estimate energy and demand savings for each of the kit items. Input parameters were provided by program participant responses in the surveys. For more technical inputs the evaluation applied deemed values provided by the Mid-Atlantic TRM v9.

Demand savings coincident factors (CF) for the summer and winter seasons were estimated to align with peak demand periods[2] for each jurisdiction using the study on residential domestic hot water use referenced by the Mid-Atlantic TRM[3]. This method takes into account the average hot water use by fixture type (showerhead, faucet aerator) during the peak period along with the probability of the evaluation daily hours of use occurring at the same time.

3.3.3.1 Showerheads

The Save Energy and Water Kit contained multiple low-flow showerheads with the quantity depending on the size of the kit received. Small kit participants received one showerhead; those qualifying for a medium kit received two showerheads. The equations below outline the algorithms utilized to estimate savings accrued by the faucet aerator measures with parameters defined in Table 3-4.

Equation 3-1: Showerhead Energy Savings Algorithm

$$\Delta kWh = ISR \times ELEC \times \frac{\Delta GPM \times HOU \times \Delta T \times 8.3 \frac{BTU}{gal \cdot °F}}{3{,}412 \frac{BTU}{kWh} \times RE}$$

[2] Both the Carolinas and Progress jurisdictions define their demand peaks as July, 4pm to 5pm (Summer) and January, 7am to 8am (Winter)

[3] Aquacraft, DeOreo and Mayer, *The End Uses of Hot Water in Single Family Homes from Flow Trace Analysis*

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$$HOU = \frac{T_{shower} \times N_{persons} \times Showers_{per\ person} \times 365 \frac{days}{year}}{Showers_{per\ home}}$$

Equation 3-2: Showerhead Demand Savings Algorithm

$$\Delta kW = CF \times \frac{\Delta kWh}{HOU}$$

Table 3-4: Inputs for Showerhead Savings Calculations

Input	Units	Showerhead Savings Input		Source
		DEC	DEP	
ISR, showerhead 1	n/a	56%	57%	Participant survey responses
ISR, showerhead 2	n/a	34%	37%	Participant survey responses
ELEC	n/a	88%	89%	Participant survey responses
ΔGPM	gpm	1.0		Baseline, Mid-Atlantic TRM v9 Retrofit, product specification sheet
T_{shower}	minutes/shower	9.1	9.6	Participant survey responses
$N_{persons}$	people/home	2.60	2.71	Participant survey responses
$Showers_{per\ person}$	showers/person/day	1.04	1.00	Participant survey responses
$Showers_{per\ home}$	showers/home	1.34	1.42	Participant survey responses
ΔT	°F	44.1°		Mid-Atlantic TRM v9
RE	n/a	98%		Mid-Atlantic TRM v9
CF, summer	n/a	0.0095	0.0095	Mid-Atlantic TRM v9, adjusted
CF, winter	n/a	0.0342	0.0340	Mid-Atlantic TRM v9, adjusted

The number of showerheads provided to each participant is dependent on the size of the kit received; with small kits providing a single showerhead and medium kits providing two. Since the evaluation demonstrated that equipment in-service rates drop as additional items are provided (i.e. a second showerhead) it is important to show the difference in estimated savings between the first and second showerhead provided to a participant. Savings for each showerhead, as shown in Table 3-5, are calculated at the jurisdiction level using all the same measure inputs from Table 3-4 expect for the in-service rate. This single change accounts for the full difference in energy and demand savings for the measure. Weighted averages presented here align with previous per unit savings shown in Table 1-4 and Table 1-8 and represent the average savings for each showerhead provided through the program.

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Table 3-5: Showerhead Savings, per unit

Jurisdiction	Item	Program Population	Verified Savings, per unit		
			Energy (kWh)	Summer Demand (kW)	Winter Demand (kW)
DEC	Showerhead 1	44,114	365	0.031	0.111
	Showerhead 2	17,750	224	0.019	0.068
	Weighted Avg		325	0.028	0.099
DEP	Showerhead 1	26,112	374	0.032	0.114
	Showerhead 2	11,633	242	0.021	0.074
	Weighted Avg		333	0.028	0.101

3.3.3.2 Faucet Aerators

The Save Energy and Water Kit contained one kitchen faucet aerator and two bathroom faucet aerators. The equations below outline the algorithms utilized to estimate savings accrued by the faucet aerator measures with parameters defined in Table 3-6.

Equation 3-3: Faucet Aerator Energy Savings Algorithm

$$\Delta kWh = ISR \times ELEC \times \frac{(GPM_{base} \times Throttle_{base} - GPM_{low} \times Throttle_{low}) \times HOU \times 8.3 \frac{BTU}{gal \cdot °F} \times \Delta T}{3,412 \frac{BTU}{kWh} \times RE}$$

$$HOU = T_{faucet} \times N_{persons} \times 365 \frac{days}{year} \times DR$$

Equation 3-4: Faucet Aerator Demand Savings Algorithm

$$\Delta kW = CF \times \frac{\Delta kWh}{HOU}$$

Table 3-6: Inputs for Kitchen Faucet Aerator Measures Savings Calculations

Measurement	Units	Kitchen Aerator Savings Input		Source
		DEC	DEP	
ISR	n/a	39%	42%	Participant survey responses
ELEC	n/a	88%	89%	Participant survey responses
GPM_{base}	gpm	2.2		Mid-Atlantic TRM v9
GPM_{low}	gpm	1.0		Product specification sheet
$Throttle_{base}$	n/a	83%		Mid-Atlantic TRM v9
$Throttle_{low}$	n/a	95%		Mid-Atlantic TRM v9
T_{faucet}	minutes/day	4.5		Mid-Atlantic TRM v9

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Measurement	Units	Kitchen Aerator Savings Input		Source
		DEC	DEP	
$N_{persons}$	persons/home	2.54	2.67	Participant survey responses
DR	n/a	50%		Mid-Atlantic TRM v9
ΔT	°F	32.1		Mid-Atlantic TRM v9
RE	n/a	98%		Mid-Atlantic TRM v9
CF, summer	n/a	0.0048	0.0051	Mid-Atlantic TRM v9, adjusted
CF, winter	n/a	0.0055	0.0058	Mid-Atlantic TRM v9, adjusted

Table 3-7: Kitchen Faucet Aerator Savings, per unit

Jurisdiction	Item	Verified Savings, per unit		
		Energy (kWh)	Summer Demand (kW)	Winter Demand (kW)
DEC	Kitchen Aerator	50	0.003	0.004
DEP	Kitchen Aerator	57	0.004	0.005

Table 3-8: Inputs for Bathroom Faucet Aerator Measures Savings Calculations

Measurement	Units	Bathroom Aerator Savings Input		Source
		DEC	DEP	
ISR, bath aerator 1	n/a	42%	48%	Participant survey responses
ISR, bath aerator 2	n/a	18%	27%	Participant survey responses
ELEC	n/a	88%	89%	Participant survey responses
GPM_{base}	gpm	2.2		Mid-Atlantic TRM v9
GPM_{low}	gpm	1.0		Product specification sheet
$Throttle_{base}$	n/a	83%		Mid-Atlantic TRM v9
$Throttle_{low}$	n/a	95%		Mid-Atlantic TRM v9
T_{faucet}	minutes/day	1.6		Mid-Atlantic TRM v9
$N_{persons}$	persons/home	2.63	2.78	Participant survey responses
DR	n/a	70%		Mid-Atlantic TRM v9
ΔT	°F	25.1°		Mid-Atlantic TRM v9
RE	n/a	98%		Mid-Atlantic TRM v9
CF, summer	n/a	0.0025	0.0026	Mid-Atlantic TRM v9, adjusted
CF, winter	n/a	0.0028	0.0030	Mid-Atlantic TRM v9, adjusted

Bathroom faucet aerators are also provided to each participant based on the size of the kit received; with small kits providing a single bathroom aerator and medium kits providing two. It's

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important to show the difference in estimated savings between the first and second bathroom faucet aerator in a kit so savings for each bathroom aerator (Table 3-5) are calculated at the jurisdiction level using all the same measure inputs from Table 3-4, with in-service rate as the only exception. Weighted averages presented here align with previous per unit savings shown in Table 1-4 and Table 1-8 and represent the average savings for each bathroom faucet provided through the program.

Table 3-9: Bathroom Faucet Aerator Savings, per unit

Jurisdiction	Item	Program Population	Verified Savings, per unit		
			Energy (kWh)	Summer Demand (kW)	Winter Demand (kW)
DEC	Bathroom Aerator 1	44,114	21.7	0.0021	0.0024
	Bathroom Aerator 2	17,750	9.4	0.0009	0.0010
	Weighted Avg		15.5	0.0015	0.0017
DEP	Bathroom Aerator 1	26,112	26.6	0.0026	0.0029
	Bathroom Aerator 2	11,633	15.2	0.0015	0.0017
	Weighted Avg		20.9	0.0020	0.0023

3.3.3.3 Insulating Pipe Tape

All participants received a 15 foot roll of insulating pipe tape with their kit. To estimate the impacts resulting from the installation of the pipe tape measure, the evaluation team used the algorithms presented below.

Equation 3-5: Insulating Pipe Tape Energy Savings Algorithm

$$\Delta kWh = ISR \times ELEC \times \frac{\left(\frac{1}{R_{ex}} - \frac{1}{R_{new}}\right) \times L \times C \times \Delta T \times 8,760}{\eta DHW \times 3,413}$$

Equation 3-6: Insulating Pipe Tape Demand Savings Algorithm

$$\Delta kW = \frac{\Delta kWh}{8,760}$$

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Table 3-10: Inputs for Insulating Pipe Tape Savings Calculations

Input	Units	Pipe Tape Savings Input		Source
		DEC	DEP	
ISR	n/a	36%	35%	Participant survey responses
ELEC	n/a	88%	89%	Participant survey responses
R_{ex}	n/a	1.00		Mid-Atlantic TRM v9
R_{new}	n/a	3.00		Product specification sheet
L	linear feet	5.01	4.78	Participant survey responses*
C	feet	0.20		Average outer diameter of 0.5" and 0.75" pipe
ΔT	°F	65°		Mid-Atlantic TRM v9
ηDHW	n/a	98%		Mid-Atlantic TRM v9

*Participant-provided estimated lengths of hot water pipe covered by the pipe tape was used to estimate verified savings.

Table 3-11: Insulating Pipe Tape Savings, per linear foot

Jurisdiction	Item	Verified Savings		
		Energy (kWh)	Summer Demand (kW)	Winter Demand (kW)
DEC	Pipe Tape	7.0	0.0008	0.0008
DEP	Pipe Tape	6.9	0.0008	0.0008

3.4 Billing Regression Analysis

In addition to engineering analysis, the evaluation team attempted to estimate energy savings by analyzing energy use patterns before and after participation in the SEWKP – commonly referred to as billing analysis. After a thorough investigation, which is described in more detail below, we concluded that, absent a randomized control trial, billing analysis was unable to reliably detect energy savings associated with the kit effort. When the percent change in household energy use is small the only reliable way to estimate energy savings using billing analysis is through a randomized control trial with large treatment and control groups and pre- and post-data. Thus, the evaluation team's recommendation is to rely on the engineering analysis and findings as the source of the verified gross and net savings for the program. Below we discuss how we attempted to complete a billing analysis and how we ultimately determined such an analysis was not feasible.

To estimate energy savings with billing data, it is necessary to estimate what energy consumption would have occurred in the absence of SEWKP – the counterfactual or baseline. To infer that the program led to energy savings, it is necessary to systematically eliminate plausible alternative explanations for differences in electricity use patterns.

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The basic framework for the analysis is illustrated in Figure 3-3 and relies on both a control group and pre- and post-enrollment billing data. The analysis is implemented in two parts via weather-normalized pre-post and difference-in-differences techniques. The former utilizes observed weather patterns to assess changes in normalized electric consumption during the pre-treatment and post-treatment periods, while the latter compares program participants to a matched comparison group, and removes any pre-existing differences between the treatment and control groups. If the program's kit lead to reductions in consumption, we should observe:

- A change in consumption for households that participated in the SEWKP
- No similar change in consumption for the control group
- The timing of the change should coincide with the receipt of kits

Figure 3-3: Framework for Billing Analysis with Comparison Groups
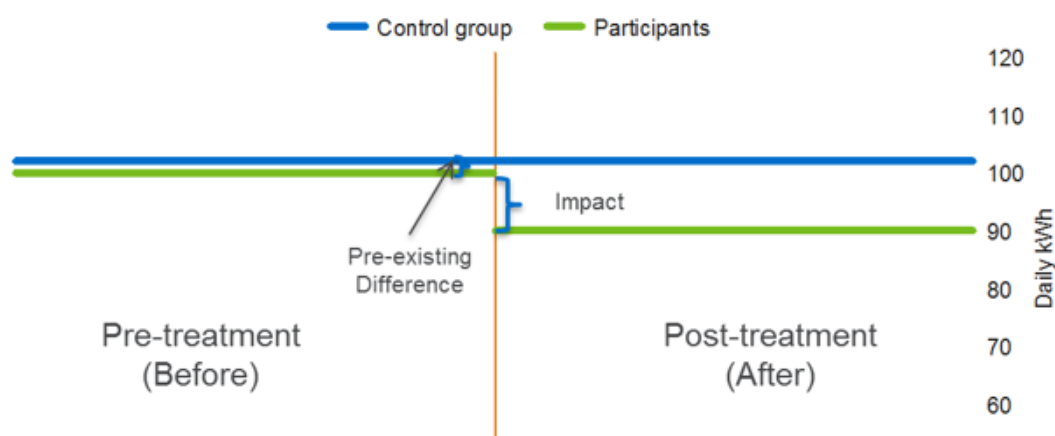
While the SEWKP did not have a randomly assigned control group, the evaluation team did develop a comparison group to use in its analysis. However, there were several key challenges to producing reliable energy savings estimates using billing analysis. The two challenges that could not be addressed despite the use of a comparison group were the small effect size and selection bias. On a percentage basis, the expected energy savings from each kit were less than 2% of annual household energy consumption, and therefore it proved difficult to isolate the impacts of the program from other potential explanations, including random chance. Second, households that signed up for the kit self-selected from their peers. Despite using a comparison group, it could only account for observable characteristics like pre-treatment energy use patterns. As a result, while the participant and comparison group may have had similar energy use patterns in the pre-treatment period, their energy use trajectories absent program participation were not necessarily the same due to differences in the household use patterns.

From a practical standpoint, the use of billing analysis as the primary evaluation approach poses a number of possible challenges.

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- Effect size - on a percentage basis, expected impacts from the program are small (0.5% to 1.5%) and thus difficult to distinguish from the inherent "noise" in the billing data;

- Timing of intervention - changes in the mix of participants and/or the timing of individual measure installations can be confused with natural changes in energy use;

- Self-selection - customers who enroll in SEWKP are inherently different than customers who do not:

- They likely have different water use technology, household occupancy, and/or water consumption needs that can yield different responses to program intervention(s);

- In order to be effective, the kits rely on customers to correctly install the individual fixtures themselves

In order to assess if the billing analysis produced reliable results, we implemented a series of placebo pressure tests. The approach consisted of simulating fake enrollments prior to actual participation in the program and assessing if the models detected an effect when using data from the false "pre" period to estimate the counterfactual for the false "post" period. Because enrollment dates were fictitious and actual post periods were excluded, we knew impacts were actually zero and any estimated impacts were due to modeling error. The evaluation team used two years of pre-treatment data for the placebo tests and each participant's enrollment date was simulated to have occurred between three to nine months prior to actual participation, in increments of one month. The placebo tests were implemented using both a fixed-effects pre-post panel regression model (using only treatment group data) and a difference-in-differences panel regression that made use of the matched comparison group.

Figure 3-4 shows the results from the pre-post placebo tests. Rather than produce zero impacts, the models estimated that the simulated enrollments led to changes in energy use when in fact no intervention had taken place. Moreover, the models incorrectly concluded that the erroneous impacts were statistically significant in several instances – an example of false precision. The pre-post model without a comparison group consistently estimated energy savings when impacts were in fact zero. The difference-in-differences model (Figure 3-5) that made use of the comparison group had less variable results, but it estimated energy increases in the range of roughly 1% to 1.5% when no intervention had taken place. Hence, neither method produced reliable energy savings estimates.

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Figure 3-4: Placebo Pressure Test Results (Pre-Post)

Placebo impacts simulate analysis when answer is zero
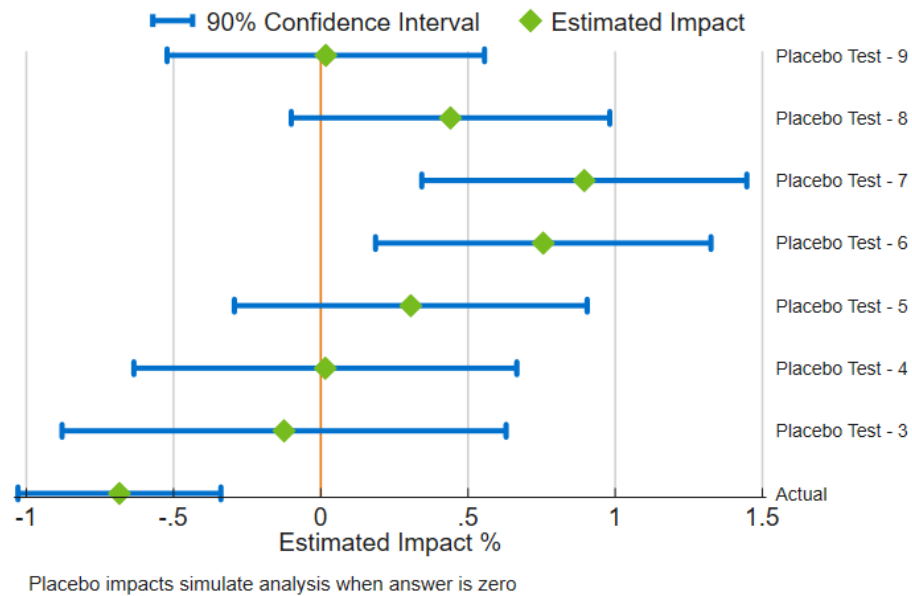
Figure 3-5: Placebo Pressure Test Results (Difference-in-Differences)

Placebo impacts simulate analysis when answer is zero
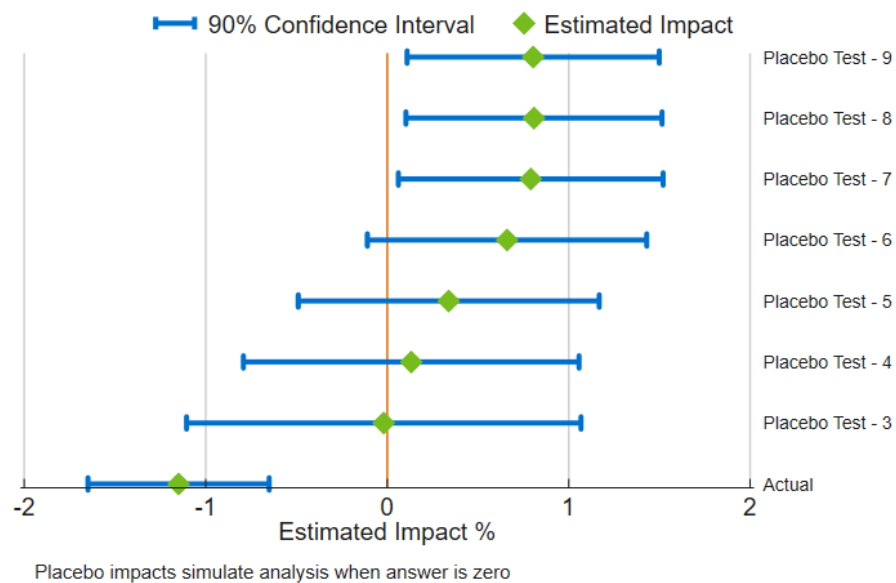
When the percent change in household energy use is small, as it is with the SEWKP, the only reliable way to estimate energy savings using billing analysis is through a randomized control trial (RCT) using large treatment and control groups combined with pre- and post-enrollment billing data. The most critical component of a well-designed RCT is to guarantee there are no differences between the treatment and control groups, other than the treatment of the program. This is a critical step to ensure that the analysis is able to accurately estimate the counterfactual

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– or what would have happened absent the treatment. If inherent differences exist between the treatment group and control group, any changes in the post-treatment period could be due to these differences, rather than the treatment itself. In order to verify that effects are purely the result of the treatment intervention, the two groups must be ostensibly identical in every way except for the intervention.

Guaranteeing homogeneity between treatment and control groups is not achievable with an opt-in enrollment method. The fact that one group of customers chose to enroll in the program while the other did not implies that some intrinsic difference between them does exist. These differences may include:

- Behavioral preferences or predispositions for energy and water efficiency measures
- Information about the program that is not accessible to non-enrollees
- Higher energy needs and therefore a greater incentive to curb their consumption

Any of these characteristics are likely to contribute to consumption responses or patterns that cannot be attributable to the program intervention. A well-designed RCT includes randomly selected customers in the treatment and control groups, thereby ensuring that the analysis avoids adverse effects of selection bias and/or lurking confounding variables. Due to these variables, RCTs are impracticable for opt-in programs.

After a thorough investigation, we concluded that, absent a RCT, billing analysis was unable to reliably detect energy savings resulting from participation in the program. The evaluation team's conclusion is not that there were no energy savings generated by the SEWKP program, but rather that billing analysis was not the correct tool for estimating the small percentage of energy savings attributable to the program. Thus, the evaluation team's recommendation is to rely on the engineering analysis and findings as the source of our verified gross and net savings for the programs.

3.5 Targeted and Achieved Confidence and Precision

We developed the SEWKP evaluation plan with the goal of achieving a target of 10% relative precision at the 90% confidence interval across both jurisdictions at the program level. Due to a high response rate from the web-based surveys, the evaluation team was able to surpass this target and achieve a high level of statistical precision. The final sample yielded a relative precision of ±4.6% for DEC and ±4.5% for DEP at the 90% confidence level (Table 3-12).

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Table 3-12: Targeted and Achieved Confidence and Precision

Jurisdiction	Targeted Confidence/Precision	Achieved Confidence/Precision
DEC	90% ± 10%	90% ± 4.6%
DEP		90% ± 4.5%

3.6 Results

Measure-level and kit-level energy savings values for DEC and DEP Save Energy and Water Kit Programs are detailed in the following charts and tables.

3.6.1 Duke Energy Carolinas

Participant survey responses in DEC led to positive energy savings adjustments with a program realization rate of 134%. Three of the four measures verified energy savings above the program reported values.

Figure 3-6: DEC Gross Verified Energy Savings
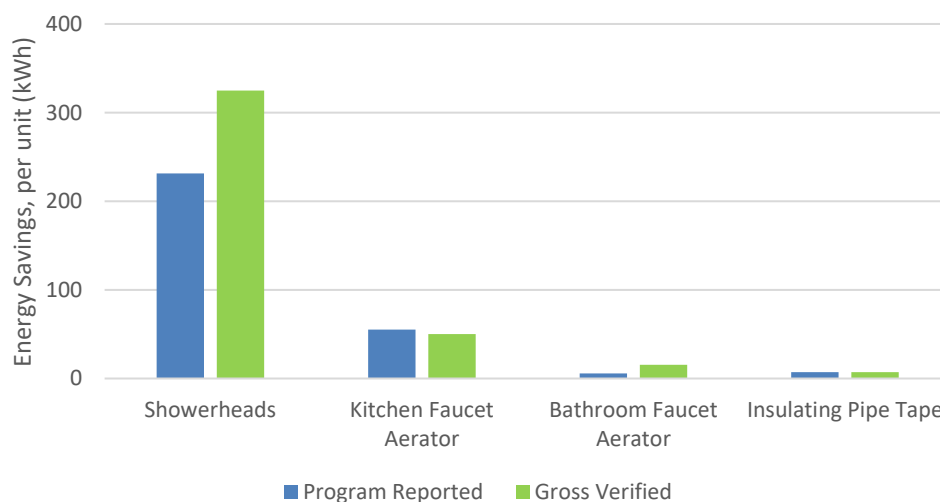
Table 3-13: DEC Measure-Level Reported and Verified Gross Energy Savings

Measure	Reported Energy Savings, per unit (kWh)	Realization Rate	Verified Energy Savings, per unit (kWh)
Low-flow Showerhead	231.4	140%	324.9
Low-flow Kitchen Aerator	55.2	91%	50.2
Low-flow Bathroom Aerator	5.7	272%	15.5
Insulating Pipe Tape*	7.0	100%	7.0

* Savings for pipe tape is a per linear foot measurement

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Measure-level and kit-level demand savings are detailed in Table 3-14.

Table 3-14: DEC Measure-Level Reported and Verified Demand Gross Savings

Measure	Summer Demand, per unit (kW)			Winter Demand, per unit (kW)		
	Reported	Realization Rate	Gross Verified	Reported	Realization Rate	Gross Verified
Low-flow Showerhead	0.0740	37%	0.0276	0.0556	178%	0.0989
Low-flow Kitchen Aerator	0.0300	12%	0.0035	0.0133	30%	0.0040
Low-flow Bathroom Aerator	0.0030	50%	0.0015	0.0014	125%	0.0017
Insulating Pipe Tape*	0.0008	100%	0.0008	0.0017	48%	0.0008

* Savings for pipe tape is a per linear foot measurement

The impact evaluation for the 2018-2019 DEC SEWKP program resulted in a program energy realization rate of 134% and demand realization rates of 34% (summer) and 157% (winter) as presented in Table 3-15 and Table 3-16.

Table 3-15: DEC Energy Savings per Kit

Kit Size	Population	Reported Energy (kWh)	Energy Realization Rate	Gross Verified Energy (kWh)
Small	26,364	333	145%	482
Medium	17,750	564	125%	706
Program Total	**44,114**	**426**	**134%**	**572**

Table 3-16: DEC Demand Savings per Kit

Kit Size	Summer Demand (kW)			Winter Demand (kW)		
	Reported	Realization Rate	Gross Verified	Reported	Realization Rate	Gross Verified
Small	0.114	36%	0.042	0.073	168%	0.123
Medium	0.188	32%	0.061	0.129	148%	0.191
Program Total	**0.144**	**34%**	**0.049**	**0.096**	**157%**	**0.150**

Table 3-17 presents the reported and verified energy and demand savings for the 2018-2019 program year.

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Table 3-17: DEC Program Level Savings

Measurement	Population	Reported	Realization Rate	Gross Verified
Energy (kWh)		18,797,312	134%	25,232,766
Summer Demand (kW)	44,114	6,342.5	34%	2,169.1
Winter Demand (kW)		4,216.8	157%	6,624.4

3.6.2 Duke Energy Progress

Participant survey responses in DEP led to positive energy savings adjustments with a program realization rate of 108%, as showerheads and bathroom faucet aerators had higher than reported energy savings values.

Figure 3-7: DEP Gross Verified Energy Savings
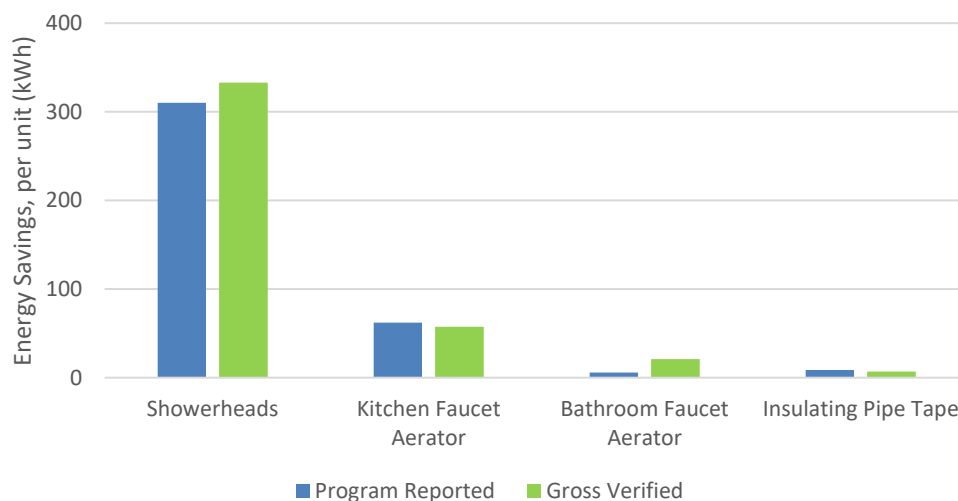
Table 3-18: DEP Measure-Level Reported and Verified Gross Energy Savings

Measure	Reported Energy Savings, per unit (kWh)	Realization Rate	Verified Energy Savings, per unit (kWh)
Low-flow Showerhead	310.1	107%	333.1
Low-flow Kitchen Aerator	62.2	92%	57.3
Low-flow Bathroom Aerator	5.9	354%	20.9
Insulating Pipe Tape*	8.8	79%	6.9

* Savings for pipe tape is a per linear foot measurement

Measure-level and kit-level demand savings are detailed in Table 3-19.

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Table 3-19: DEP Measure-Level Reported and Verified Demand Gross Savings

Measure	Summer Demand, per unit (kW)			Winter Demand, per unit (kW)		
	Reported	Realization Rate	Gross Verified	Reported	Realization Rate	Gross Verified
Low-flow Showerhead	0.0990	29%	0.0283	0.0841	121%	0.1014
Low-flow Kitchen Aerator	0.0330	12%	0.0040	0.0169	27%	0.0045
Low-flow Bathroom Aerator	0.0030	68%	0.0020	0.0016	144%	0.0023
Insulating Pipe Tape*	0.0010	79%	0.0008	0.0024	33%	0.0008

* Savings for pipe tape is a per linear foot measurement

The impact evaluation for the 2018-2019 DEP SEWKP program resulted in a program energy realization rate of 108% and demand realization rates of 28% (summer) and 111% (winter) as presented in Table 3-20 and Table 3-21.

Table 3-20: DEP Energy Savings per Kit

Kit Size	Population	Reported Energy (kWh)	Energy Realization Rate	Gross Verified Energy (kWh)
Small	14,479	428	118%	506
Medium	11,633	738	101%	748
Program Total	**26,112**	**566**	**108%**	**614**

Table 3-21: DEP Demand Savings per Kit

Kit Size	Summer Demand (kW)			Winter Demand (kW)		
	Reported	Realization Rate	Gross Verified	Reported	Realization Rate	Gross Verified
Small	0.143	30%	0.044	0.107	119%	0.127
Medium	0.242	26%	0.064	0.191	105%	0.200
Program Total	**0.187**	**28%**	**0.053**	**0.144**	**111%**	**0.160**

Table 3-22 presents the reported and verified energy and demand savings for the 2018-2019 program year.

Table 3-22: DEP Program Level Savings

Measurement	Population	Reported	Realization Rate	Gross Verified
Energy (kWh)		14,785,941	108%	16,025,692
Summer Demand (kW)	26,112	4,885.7	28%	1,375.6
Winter Demand (kW)		3,760.8	111%	4,166.3

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4 Net-to-Gross Methodology and Results

The evaluation team used participant survey data to calculate a net-to-gross (NTG) ratio for SEWKP. NTG reflects the effects of free ridership (FR) and spillover (SO) on gross savings. Free ridership refers to the portion of energy savings that participants would have achieved in the absence of the program through their own initiatives and expenditures (U.S. DOE, 2014).[4] Spillover refers to the program-induced adoption of additional energy-saving measures by participants who did not receive financial incentives or technical assistance for the additional measures installed (U.S. DOE, 2014). The evaluation team used the following formula to calculate the NTG ratio:

$$NTG = 1 - FR + SO$$

4.1 Free Ridership

Free ridership estimates how much the program influenced participants to install the energy-saving items included in the energy efficiency kit. Free ridership ranges from 0 to 1, with 0 being no free ridership and 1 being total free ridership.

The evaluation team used participant survey data to estimate free ridership. The survey used several questions to identify items that a given participant installed and did not later uninstall: respondents were only asked free ridership questions about items that remained installed by the date of the survey.

The evaluation team's methodology for calculating free ridership consists of two components, free ridership change (FRC) and free ridership influence (FRI), both of which range from 0 to .5 in value.

$$FR = FRC + FRI$$

4.1.1 Free Ridership Change

FRC reflects what participants reported they would have done if the program had not provided the items in the kit. For each respondent, the survey assessed FRC for each measure that the respondent installed and did not later uninstall.

Specifically, the survey asked respondents which, if any, of the currently installed items they would have purchased and installed on their own within the next year if Duke Energy had not provided them. For respondents who installed more than one of a given measure (bathroom

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[4] The U.S. Department of Energy (DOE) (2014). *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures. Chapter 23: Estimating Net Savings: Common Practices.* Retrieved August 29, 2016 from http://energy.gov/sites/prod/files/2015/02/f19/UMPChapter23-estimating-net-savings_0.pdf.

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aerators or showerheads) that indicated they would have installed either of the multi-count measures on their own, we asked them a follow up question that determined how many of the number installed through the program that they would have installed on their own.

For each measure, the evaluation team assigned one of the FRC values shown in the Table 4-1, based on the respondents' responses. FRC values range from 0.0 to 0.5.

Table 4-1: Free Ridership Change Values

What Respondent Would Have Done Absent the Program*	FRC Value
Would ***not*** have purchased and installed the item within the next year	0.00
Would have purchased and installed the item within the next year	$\dfrac{\text{Count respondent said would install on their own}}{\text{Count respondent installed through program}}$

*Survey response to: If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

4.1.2 Free Ridership Influence

FRI assesses how much influence the program had on a participant's decision to install (and keep installed) the items in the kit. The survey asked respondents to rate how much influence four program-related factors had on their respective decisions to install the measures, using a scale from 0 ("not at all influential") to 10 ("extremely influential"). The program-related factors included:

- The fact that the items were free
- The fact that the items were mailed to their home
- Information provided by Duke Energy about how the items would save energy and water
- Other information or advertisements from Duke Energy, including its website

Asking respondents to separately rate the influence of each of the four above items had on the decision to install each measure would have been overly burdensome. Therefore, while the survey assessed FRC for each measure type, it assessed collective FRI for all measures.

FRI is based on the highest-rated item in the FRI battery. The evaluation team assigned the following FRI scores, based on that rating (Table 4-2).

Table 4-2: Free Ridership Influence Values

Highest Influence Rating	FRI Value
0	0.50
1	0.45
2	0.40
3	0.35

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Highest Influence Rating	FRI Value
4	0.30
5	0.25
6	0.20
7	0.15
8	0.10
9	0.05
10	0.00

4.1.3 Total Free Ridership

The evaluation team calculated total free ridership by measure by calculating

- First, measure-specific FR scores for each respondent by summing each respondent's measure-specific FRC score with their FRI score.

- Second, a measure-specific average FR score across all respondents, weighted by the number of units installed by each respondent.

The evaluation team then estimated overall program-level free ridership by calculating a savings-weighted mean of the measure-specific FR scores. Table 4-3 presents the measure-specific and overall FR estimates.

Table 4-3: Measure-Specific Free Ridership Scores

End-use	Measure-Specific Free Ridership	
	Carolinas	Progress
Showerhead	9.5%	8.2%
Kitchen Faucet Aerator	9.6%	8.1%
Bathroom Faucet Aerator	6.3%	4.8%
Insulating Pipe Tape	8.3%	7.6%
Overall	**9.3%**	**8.0%**

4.2 Spillover

Spillover estimates energy savings from additional energy improvements made by participants who are influenced by the program to do so and is used to adjust gross savings. The evaluation team used participant survey data to estimate spillover. The survey asked respondents to indicate what energy-saving measures they had implemented since participating in the program. The evaluation team then asked participants to rate the influence the program had on their decision to purchase these additional energy-saving measures on a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential."

The evaluation team converted the ratings to a percentage representing the program-attributable percentage of the measure savings, from 0% to 100%. The team then applied the

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program-attributable percentage to the savings associated with each reported spillover measure to calculate the participant measure spillover (PMSO) for that measure. We defined the per-unit energy savings for the reported spillover measures based on previous Duke Energy Smart$aver evaluations, ENERGY STAR® calculators, and algorithms and parameter assumptions listed in the Mid-Atlantic TRM v9.

Since Duke Energy offered program incentives for a variety of energy-saving measures throughout the evaluation period, we compared the list of customers reporting measures as spillover against participation records for other Duke Energy programs that offered the measure. To avoid double-counting savings for measures already claimed by another Duke Energy offering, we excluded savings from measures that appeared in another program's tracking data from our estimation of spillover savings.

Participant measure spillover is calculated as follows:

$$PMSO = Deemed\ Measure\ Savings * Program\ Attributable\ Percentage$$

The evaluation team summed all PMSO savings values for each jurisdiction (Table 4-4 and Table 4-5).

Table 4-4: DEC Sample PMSO, by Measure by Category

Measure Category	Total kWh for Category	Percent Share of kWh
LEDs	5,532	24%
Duct Sealing	4,553	20%
Appliance	3,850	17%
HVAC	3,632	16%
Insulation	2,108	9%
Windows	1,695	7%
Water Heater	1,616	7%
CFLs	167	1%
Total	**23,153**	**100%**

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Table 4-5: DEP Sample PMSO, by Measure by Category

Measure Category	Total kWh for Category	Percent Share of kWh
LEDs	19,868	51%
ENERGY STAR Home	5,157	13%
HVAC	4,678	12%
Appliance	3,293	8%
Duct Sealing	1,680	4%
Water Heater	1,385	4%
CFLs	980	3%
Windows	945	2%
Insulation	754	2%
Total	**38,740**	**100%**

The evaluation team then calculated gross program savings associated with sampled participants by summing the products of each measure's average per household savings and the total sample size (Table 4-6 and Table 4-7).

Table 4-6: DEC Sample Gross Program Savings (n=131)

Measure	Average per Household Savings (kWh)	Verified Sample Savings (kWh)
Showerhead	459	146,838
Kitchen Faucet Aerator	50	16,077
Bathroom Faucet Aerator	31	9,930
Insulating Pipe Tape	35	11,225
Total	**575**	**184,070**

Table 4-7: DEP Sample Gross Program Savings (n=114)

Measure	Average per Household Savings (kWh)	Verified Sample Savings (kWh)
Showerhead	513	176,023
Kitchen Faucet Aerator	5	19,658
Bathroom Faucet Aerator	42	14,324
Insulating Pipe Tape	33	11,392
Total	**645**	**221,397**

The evaluation team then divided the summed jurisdictional PMSO values by the sample's gross program savings to calculate an estimated spillover percentage for the program:

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$$Program\ SO = \frac{\sum PMSO}{\sum Sample\ Gross\ Program\ Savings}$$

$$DEC\ SO = \frac{23,153}{184,070} = 12.6\%$$

$$DEP\ SO = \frac{38,740}{221,397} = 17.5\%$$

These calculations produced a spillover estimate of 12.6% for the DEC program and 17.5% for the DEP program. Lower spillover in the Carolinas territory is partially due to Duke Energy's Free LED Program that allows many participants to install new LED lamps in their home at no cost. Since these free LEDs are provided by Duke Energy they are excluded from any spillover estimates.

4.3 Net-to-Gross

Inserting the FR and SO estimates into the NTG formula (NTG = 1 – FR + SO) produces an NTG value of 103.3% for the DEC program and 109.5% for the DEP program (Table 4-8). The evaluation team applied this NTG ratio to program-wide verified gross savings to calculate SEWKP kit net savings for the jurisdiction (Table 4-9 and Table 4-10).

Table 4-8: Net-to-Gross Results

Jurisdiction	Free Ridership	Spillover	NTG
Carolinas	9.3%	12.6%	**103.3%**
Progress	8.0%	17.5%	**109.5%**

Table 4-9: DEC Program Level Savings

Measurement	Population	Gross Verified	Net-to-Gross Ratio	Net Verified
Energy (kWh)		25,232,766		26,066,590
Summer Demand (kW)	44,114	2,169	103.3%	2,241
Winter Demand (kW)		6,624		6,843

Table 4-10: DEP Program Level Savings

Measurement	Population	Gross Verified	Net-to-Gross Ratio	Net Verified
Energy (kWh)		16,025,692		17,557,372
Summer Demand (kW)	26,112	1,376	109.5%	1,507
Winter Demand (kW)		4,166		4,565

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5   Process Evaluation

5.1   Summary of Data Collection Activities

The process evaluation is based on interviews and surveys with program staff, implementer staff, and households who received a kit during the program evaluation year (Table 5-1).

Table 5-1: Summary of Process Evaluation Data Collection Activities

Target Group	Method	Sample Size	Population	Confidence / Precision
Duke Energy program staff	Phone in-depth interview	1	n/a	n/a
Implementation staff: EFI	Phone in-depth interview	1	n/a	n/a
DEC participants	Mixed mode (web/phone) survey	320	27,939	90% ± 4.6%
DEP participants	Mixed mode (web/phone) survey	343	49,353	90% ± 4.5%

5.2   DEC Process Evaluation Findings

Installation Rates

Most kit recipients (79%) installed at least one measure, installing an average of two measures from the kit. A majority of kit recipients (63%) initially installed at least one of the showerheads, and slightly less than half initially installed at least one of the bathroom faucet aerators (46%) or kitchen faucet aerators (44%) with a smaller proportion reporting installing pipe tape (36%). Of the respondents who received a medium-sized kit, 36% installed both showerheads.[5] Regardless of kit size received, participants installed an average of one bathroom aerator and one showerhead.

Of the respondents who installed at least one item from the kit, 15% said they later uninstalled at least one of the measures, but no participants uninstalled everything they had installed. In total, 8% of all installed measure types were later uninstalled. Showerheads and kitchen faucet aerators had the highest uninstallation rates, with 12% of respondents who initially installed each later uninstalling them. In most cases, respondents said they uninstalled these water saving measures because they did not like how they worked, later elaborating that the water pressure provided was insufficient to their preferences.

Fifteen percent of respondents reported installing all measure types. Of the respondents who did not install all measure types, 74% said they plan to install at least one of the items they had not yet installed. Respondents who indicated they don't plan to install one or more of the measures typically said they would not install the remaining items because they had not "gotten around to it" (27%), they already had the item (24%), or their current one is still working (17%).

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[5] 66% of medium kit recipients installed at least one showerhead, 55% of whom installed both that came with the kit.

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Measure Satisfaction

Nearly all kit recipients reported moderate to high satisfaction with the items they installed from their kit (Figure 5-1). To best gauge the experience with the measures, we asked respondents to rate their satisfaction with all measures they installed, including those they later uninstalled. Respondents were most satisfied with the pipe tape and were least satisfied with the kitchen faucet aerator. Open-ended comments revealed that those customers who were dissatisfied with water-saving measures most often pointed to low water pressure as the reason for dissatisfaction.

Figure 5-1: DEC Participant Satisfaction with Installed Measures*
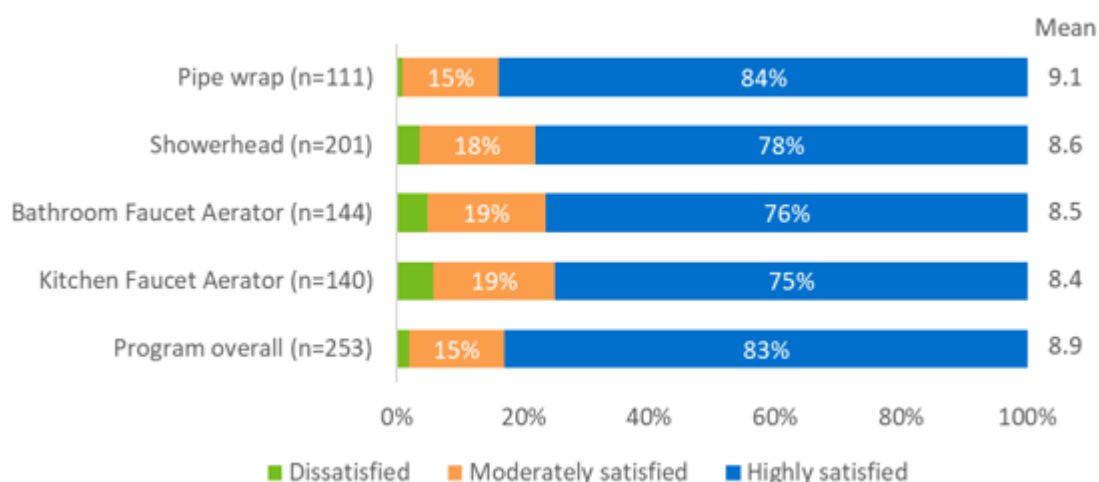
* Respondents rated their satisfaction with the measures on a scale ranging from 0 ("very dissatisfied") to 10 ("very satisfied"). Dissatisfied indicates 0-4 ratings, moderately satisfied indicates 5-7 ratings, and highly satisfied indicates 8-10 ratings.

Kit Instructional Materials

In addition to energy-saving measures, the Save Energy and Water Kit includes a detailed instructional booklet that provides information on how to install the provided measures. The vast majority of respondents (85%) said they read the booklet, and most of them (81%) found it highly helpful. Duke Energy also offers a customer care hotline that participants can call for additional assistance, but just 1% of respondents took advantage of the service.

Additional Energy Saving Actions

More than one-third of participants (37%) reported purchasing and installing additional energy efficiency measures since receiving their kit (Table 5-2). Participants most commonly reported purchasing LEDs (24%), efficient appliances (16%), or air sealing (14%), and 83% of those who installed additional energy-saving measures said the program at least partially influenced their decision.

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Table 5-2: Additional Energy Saving Measures Purchased by DEC Participants

	Percent of Respondents Reporting Purchases After Receiving the Kit	Percent Reporting at Least Some DEC Program Influence on Purchase
At least one measure	37%	31%
LEDs	24%	21%
Efficient appliances	16%	13%
Air sealing	14%	13%
Insulation	8%	7%
CFLs	6%	6%
Efficient heating or cooling equipment	6%	5%
Efficient water heater	6%	4%
Duct sealing	4%	4%
Efficient windows	4%	3%
Other	5%	3%

*Multiple Responses Allowed; n=320

5.3 DEP Process Evaluation Findings

Installation Rates

The majority (83%) of kit recipients installed at least one measure, installing an average of two measures from the kit. Most kit recipients initially installed at least one of the showerheads (65%), and slightly more than half initially installed at least one of the bathroom faucet aerators (53%). Slightly less than half installed kitchen faucet aerators (46%), and a smaller proportion reporting installing pipe tape (36%). Of the respondents who received a medium-sized kit, 39% installed both showerheads.[6] Regardless of kit size received, participants installed an average of one bathroom aerator and one showerhead.

Of the respondents who installed at least one item from the kit, 15% said they later uninstalled at least one of the measures, just one of whom uninstalled everything they had installed. In total, 9% of all installed measure types were later uninstalled. Showerheads and kitchen faucet aerators had the highest uninstallation rates, with 13% of those who installed showerheads and 9% of those who installed kitchen aerators later uninstalling them. In most cases, respondents said they uninstalled these water saving measures because they did not like how they worked, later elaborating that the water pressure provided was insufficient to their preferences.

About one-tenth (13%) of respondents reported installing all measure types. Of the respondents who did not install all measure types, 78% said they plan to install at least one of the items they had not yet installed. Respondents who indicated they don't plan to install one or more of the

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[6] 70% of medium kit recipients installed at least one showerhead, 56% of which installed both that came with the kit.

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measures typically said they would not install the remaining items because they had not "gotten around to it" (24%), already had the item (22%), or their current one is still working (21%).

Measure Satisfaction

Nearly all kit recipients reported moderate to high satisfaction with the items they installed from their kit (Figure 5-2). To best gauge the experience with the measures, we asked respondents to rate their satisfaction with all measures they installed, including those they later uninstalled. Respondents reported similar levels of satisfaction with all four measures. Open-ended comments revealed that the few customers who were dissatisfied with water-saving measures mostly pointed to low water pressure as the source of dissatisfaction.

Figure 5-2: DEP Participant Satisfaction with Installed Measures*

	Moderately satisfied	Highly satisfied	Mean
Showerhead (n=224)	19%	79%	9.0
Pipe wrap (n=116)	13%	83%	8.9
Kitchen Faucet Aerator (n=155)	16%	81%	8.8
Bathroom Faucet Aerator (n=175)	17%	79%	8.5
Program overall (n=283)	12%	86%	8.9

■ Dissatisfied   ■ Moderately satisfied   ■ Highly satisfied
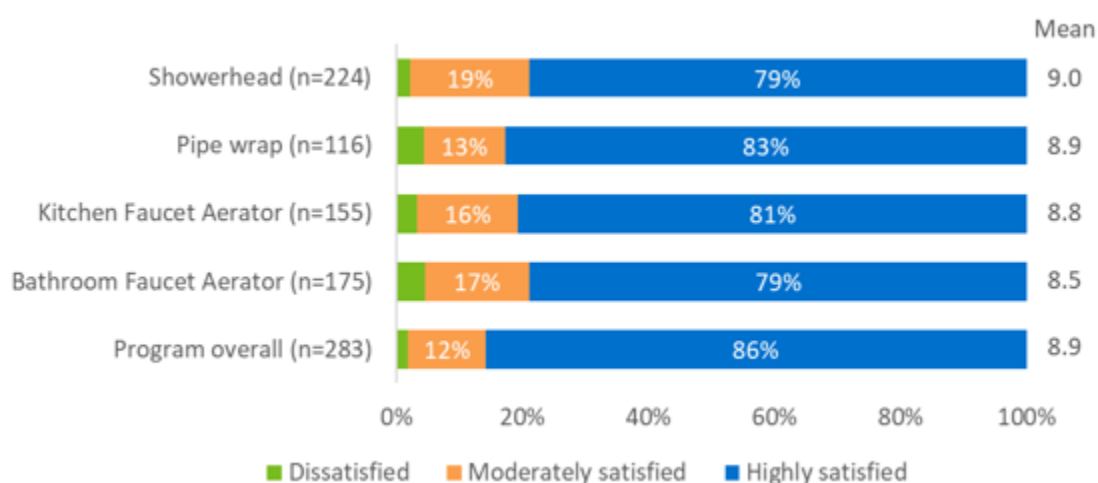
* Respondents rated their satisfaction with the measures on a 0 ("very dissatisfied") to 10 ("very satisfied") scale. Dissatisfied indicates 0-4 ratings, moderately satisfied indicates 5-7 ratings, and highly satisfied indicates 8-10 ratings.

Instructional Materials in the Kit

In addition to energy-saving measures, the Save Energy and Water Kit includes a detailed instructional booklet that provides information on how to install the provided measures. The vast majority of respondents (85%) said they read the booklet, and most of them (84%) reported they found it highly helpful. Duke Energy also offers a customer care hotline that participants can call for additional assistance, but just 1% of respondents took advantage of the service.

Additional Energy Saving Actions

Over one-third of participants (35%) reported purchasing and installing additional energy efficiency measures since receiving their kit (Table 5-3). Participants most commonly reported purchasing LEDs (25%), efficient appliances (13%), or air sealing (12%), and 78% of those who installed additional energy-saving measures said the program at least partially influenced their decision.

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Table 5-3: Additional Energy Saving Measures Purchased by DEP Participants*

	Count of Respondents Reporting Purchases After Receiving the Kit	Count Reporting at Least Some DEP Program Influence on Purchase
At least one measure	35%	27%
LEDs	25%	20%
Efficient appliances	13%	10%
Air sealing	12%	10%
Insulation	7%	5%
Efficient heating or cooling equipment	7%	4%
Energy efficient water heater	4%	3%
Efficient windows	4%	2%
CFLs	3%	3%
Duct sealing or insulation	3%	2%
Moved into ENERGY STAR home	1%	1%
Other	5%	4%

*Multiple Responses Allowed; n=343

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6 Conclusions and Recommendations

The evaluation findings led to the following conclusions and recommendations for the program.

Conclusion 1: The program model is highly successful: it leverages low-cost measures to foster energy savings that would not have happened otherwise. Duke Energy's easy process for requesting and receiving a kit with free energy and water-saving items motivated thousands of customers to request and install energy saving measures in their home during the evaluation period. Most participants installed at least one measure from the kit, relatively few measures get uninstalled, and many participants reported installing additional energy saving items since receiving the kit. The majority of participants said they would not have installed any of the items on their own, as represented by low free ridership rates, and the program is reaching a diverse range of customers in terms of household characteristics and demographics.

> **Recommendation**: Continue using SEWKP to encourage Duke Energy customers to save energy and water.

Conclusion 2: The water saving measures' low flow water pressure results in some minor dissatisfaction and uninstallation issues. Complaints of excessively low water pressure were the primary drivers of water-saving measure dissatisfaction and uninstallation. However, only a minority of participants were dissatisfied with or uninstalled any items.

> **Recommendation**: Monitor how showerhead upgrades affect satisfaction and uninstallation rates going forward.

Conclusion 3: Recent program improvements have been largely successful. Updates to the propensity model contributed to an increase in the percentage of participants that have electric water heaters from less than 80% in 2017 to nearly 90% in 2019 (from 70% to 88% for the DEC program and from 79% to 89% for the DEP program). The new instructional materials provided with the kits also appear to denote a significant improvement from the prior instructions. Recent participants rated the instructions as considerably more helpful than participants in the last evaluated program year: the percentage of customers who rated instructions as "very helpful" increased since 2017 (from 70% to 81% among DEC participants and 80% to 84% among DEP participants).

Conclusion 4: Increased penetration and saturation of measures included in the kits may limit installation rates going forward. Among participants who had yet to install measures and had no immediate plans to do so, more than 20% indicated they already had at least one of the efficient measures installed. For pipe tape, more than 30% of those without plans to install the measure reported they already had some installed (34% for DEC and 32% for DEP). These rates were nearly as high for showerheads, for which 32% of DEC respondents and 25% of DEP respondents with no plans to install indicated that they already an efficient one installed.

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Recommendation: Monitor installation rates going forward and consider excluding measures that show high rates of prior ownership.

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Appendix A   Summary Form

Save Energy and Water Kit Program
Completed EMV Fact Sheet

Description of program

The Duke Energy Save Energy and Water Kit Program (SEWKP) is an energy efficiency program that offers energy-efficient water fixtures and water pipe insulation to residential customers. The program is designed to reach customers who have not adopted energy-efficient water devices. The kits are provided to residents through a Direct Mail Campaign, allowing eligible customers to request to have the items shipped directly to their homes, free of charge.

Date	March 11, 2019
Region(s)	Carolinas and Progress
Evaluation Period	September 1st, 2018 – August 31st, 2019
Annual Gross MWh Savings	DEC: 25,233 DEP: 16,026
Per Kit Gross kWh Savings	DEC: 426 DEP: 566
Annual Gross MW Savings	DEC: 2.17 (summer), 6.62 (winter) DEP: 1.38 (summer), 4.17 (winter)
Net-to-Gross Ratio	DEC: 103.3% DEP: 109.6%
Process Evaluation	Yes
Previous Evaluation(s)	2016

Evaluation Methodology

Impact Evaluation Activities

- Telephone/web surveys (DEC n=320, DEP n=343) and analysis of 4 unique measures

Impact Evaluation Findings

- Realization rates:
  - DEC: 134% (energy); 40% (summer demand); 166% for (winter demand)
  - DEP: 108% (energy); 28% (summer demand); 111% for (winter demand)

- Net-to-gross ratio: 103.3% (DEC), 109.6% (DEP)

Process Evaluation Activities

- Telephone/web surveys (DEC n=320, DEP n=343)

- 1 interview with program staff

- 1 interview with implementation staff

Process Evaluation Findings

- The SEWKP influences participants to install kit measures and adopt new behaviors.

- Participants are generally satisfied with kit items and report high satisfaction with overall program.

- Kit size assignment algorithm is fairly accurate.

- Low water pressure is the leading contributor to dissatisfaction with water-saving items among a relatively small number of participants.

- The toll-free customer care hotline is used by a very small number of SEWKP participants

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Appendix B   Measure Impact Results

Table B-1: DEC Per Unit Verified Impacts by Measure – Key Measure Parameters

Measure Category	Gross Energy Savings (kWh)	Gross Summer Demand (kW)	Gross Winter Demand (kW)	Realization Rate (Energy)	Free Ridership	Spillover	Net to Gross Ratio	M&V Factor (Energy) (RR x NTG)	Measure Life
Low-flow Showerhead (1.5 gpm)	324.9	0.0276	0.0989	140.4%	9.5%			145.0%	10
Kitchen Faucet Aerator (1.0 gpm)	50.2	0.0035	0.0040	91.0%	9.6%	12.6%	103.3%	94.0%	10
Bathroom Faucet Aerator (1.0 gpm)	15.5	0.0015	0.0017	272.2%	6.3%			281.2%	10
Insulating Pipe Tape*	7.0	0.0008	0.0008	100.2%	8.3%			103.5%	15

* Per linear foot

Table B-2: DEP Per Unit Verified Impacts by Measure – Key Measure Parameters

Measure Category	Gross Energy Savings (kWh)	Gross Summer Demand (kW)	Gross Winter Demand (kW)	Realization Rate (Energy)	Free Ridership	Spillover	Net to Gross Ratio	M&V Factor (Energy) (RR x NTG)	Measure Life
Low-flow Showerhead (1.5 gpm)	333.1	0.0283	0.1014	107.4%	8.2%			117.7%	10
Kitchen Faucet Aerator (1.0 gpm)	57.3	0.0040	0.0045	92.1%	8.1%	17.5%	109.5%	100.9%	10
Bathroom Faucet Aerator (1.0 gpm)	20.9	0.0020	0.0023	353.9%	4.8%			387.7%	10
Insulating Pipe Tape*	6.9	0.0008	0.0008	75.5%	7.6%			82.7%	15

* Per linear foot

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Appendix C   Program Performance Metrics

This appendix provides key program performance metrics, or PPIs. See Chapter 5 for the underlying results and more detailed findings.

Figure C-1: DEC Program Experience PPIs

	Participants	
	%	**n**
Program experience & satisfaction PPIs		
Overall satisfaction with program	83%	253
Usefulness of kit instructions	81%	272
Satisfaction with kit measures		
Showerhead	78%	201
Kitchen faucet aerator	75%	140
Bathroom faucet aerator	76%	144
Pipe wrap	84%	111
Program influence on behavior PPIs		
Installed at least one kit measure	79%	320
Most common measure installed: *showerhead*	63%	320
Respondents reporting program attributable spillover	19%	320
Challenges and opportunities for improvement PPIs		
Measure with lowest installation rate: pipewrap	36%	320
Measure with highest uninstallation rate: kitchen faucet aerator	12%	142
Measure with highest dissatisfaction: kitchen faucet aerator	6%	142

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Figure C-2: DEC Participant Demographics

Ownership Status	
Own	85%
Rent	11%

Household Size	
One to two	58%
Three	16%
Four	12%
Five +	10%

Education	
High school or less	18%
Some college	31%
Bachelor's degree	25%
Graduate degree	20%

Income	
<$30k	17%
$30k to <$60k	24%
$60k to <$75k	15%
$75k to <$100k	11%
$100k+	11%

Age	
18 to 34	13%
35 to 44	15%
45 to 64	34%
65 and older	19%

Note: Refusals and "don't know" responses are not shown.

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Figure C-3: DEC Participant Household Characteristics

Housing Type	
Detached	78%
Attached	5%
Mobile	12%
Apartment or condo	1%
Duplex or triplex	3%

Water Heater Fuel Type	
Electric	87%
Natural Gas	11%
Other	1%

Home Square Feet	Small Kit	Medium Kit
Less than 1,000	17%	1%
1,000-1,499	34%	24%
1,500-1,999	23%	34%
2,000-2,999	15%	28%
3,000+	2%	8%

Number of Showers	Small Kit	Medium Kit
1	35%	12%
2	57%	69%
3	6%	16%
4+	0%	3%

Number of Kitchen Faucets	Small Kit	Medium Kit
1	93%	89%
2	4%	11%
3+	2%	0%

Number of Bathroom Faucets	Small Kit	Medium Kit
1-2	67%	47%
3-4	28%	41%
5+	4%	11%

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Figure C-4: DEC Program Experience PPIs

	Participants	
	%	**n**
Program experience & satisfaction PPIs		
Overall satisfaction with program	86%	283
Usefulness of kit instructions	84%	291
Satisfaction with kit measures		
Showerhead	79%	224
Kitchen faucet aerator	81%	155
Bathroom faucet aerator	79%	175
Pipe wrap	83%	116
Program influence on behavior PPIs		
Installed at least one kit measure	83%	343
Most common measure installed: *showerhead*	65%	343
Respondents reporting program attributable spillover	21%	343
Challenges and opportunities for improvement PPIs		
Measure with lowest installation rate: pipewrap	36%	343
Measure with highest uninstallation rate: showerhead	16%	224
Measure with highest dissatisfaction: bathroom faucet aerator	4%	181

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Figure C-5: DEC Participant Demographics

Ownership Status	
Own	88%
Rent	9%

Household Size	
One to two	54%
Three	17%
Four	16%
Five +	8%

Education	
High school or less	13%
Some college	31%
Bachelor's degree	28%
Graduate degree	19%

Income	
<$30k	15%
$30k to <$60k	25%
$60k to <$75k	11%
$75k to <$100k	12%
$100k+	11%

Age	
18 to 34	11%
35 to 44	17%
45 to 64	31%
65 and older	15%

Note: Refusals and "don't know" responses are not shown.

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Figure C-6: DEC Participant Household Characteristics

Housing Type	
Detached	77%
Attached	6%
Mobile	12%
Apartment or condo	1%
Duplex or triplex	2%

Water Heater Fuel Type	
Electric	88%
Natural Gas	9%
Other	2%

Home Square Feet	Small Kit	Medium Kit
Less than 1,000	13%	1%
1,000-1,499	31%	32%
1,500-1,999	22%	24%
2,000-2,999	19%	29%
3,000+	3%	8%

Number of Showers	Small Kit	Medium Kit
1	23%	6%
2	64%	79%
3	10%	12%
4+	2%	3%

Number of Kitchen Faucets	Small Kit	Medium Kit
1	91%	92%
2	6%	4%
3+	2%	3%

Number of Bathroom Faucets	Small Kit	Medium Kit
1-2	54%	36%
3-4	39%	54%
5+	6%	9%

Note: Refusals and "don't know" responses are not shown.

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Appendix D   Instruments

D.1   Program Staff In-Depth Interview Guide

Introduction

Today, we'll be discussing your role in the SEWKP or water kit program. We would like to learn about your experiences in administering this program.

Your comments are confidential. If I ask you about areas you don't know about, please feel free to tell me that and we will move on. Also, if you want to refer me to specific documents to answer any of my questions, that's great – I'm happy to look things up if I know where to get the information.

I would like to record this interview for my note-taking purposes. Do I have your permission?

Roles & Responsibilities

Q1.   Please describe your position at Duke Energy and your role in the water kit program.

Q2.   How long have you been in this role?

Program Delivery

Next, I'd like to learn more about how this program was delivered since your involvement. If the program implementation is different in 2017, please let me know.

Q3.   How is Duke Energy targeting households to participate in this program? Does this vary by jurisdiction?

[*IF NEEDED*:]

1.   What marketing and outreach activities did Duke Energy conduct in the 2016 program year? [*Interviewer: we know they market the program through direct-mail campaign. Probe to inquire if they market the program in any other way.*]
2.   In 2016, what proportion requested a kit among those targeted by the direct mail campaign? Are you satisfied with this response rate? If not, why not?
3.   In terms of marketing, what is planned for 2017? [*If not mentioned:* Do you all plan to have a customer facing website for the program? If yes, when and what would it entail? If not, why not?]

Q4.   What feedback, if any, did you receive from kit recipients on why they decided to request a kit?

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Q5.   Please describe the kit distribution process, including the responsibilities of your vendors: Relationship 1 (R1) and EFI.

[*IF NEEDED*:]

1.   Can the kit form be submitted online? If not, is Duke considering this option?
2.   Who checks whether customers who submitted the kit form are eligible for the program? What is the eligibility criteria?
3.   How do you identify customers who have an electric water heating? [*Interviewer: Prior evaluation states that customers with electric water heating are eligible for this program.*]
4.   Who tracks kit processing and distribution?
5.   How are kits customized? [*IF NEEDED:*] Can you describe what is included in the small, medium, and large kit? (Confirm kit contents as seen below)

Kit 1 (small)	bath aerator	2
	kitchen aerator	1
	shower head	1
	pipe tape	5
Kit 2 (medium)	bath aerator	4
	kitchen aerator	1
	shower head	2
	pipe tape	5
Kit 3 (large)	bath aerator	5
	kitchen aerator	1
	shower head	3
	pipe tape	5

6.   [*If not mentioned*] Are large kits still offered to customers? (If so, does this vary by jurisdiction?)
7.   Prior to January 2016, documentation shows the kitchen aerator to have 1.0 GPM, but according to a Duke staff person, the aerator is now rated at 1.5 GPM. Can you please confirm the current GPM for kitchen aerators, and when that changed over (if at all)?
8.   What energy saving educational materials are included in the kit?

Q6.   What type of feedback have you received from kit recipients about the measures in the kit? [*IF ANY ISSUES REPORTED:*] How have you addressed those issues?

Program Goals

Q7.   In 2016 and 2017 program year, what were/are Duke Energy targets in terms of:

1.   Number of water kits distributed in Carolinas, Progress, Ohio, Indiana, and Kentucky
2.   Number of kits distributed by customer segments – if applicable

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3.   Cost of distributing the kits [*Probe: Does this vary by jurisdiction?*]

4.   Anything else?

Q8.   How were those targets set, and by whom?

Q9.   Compared to the previous program years, have these targets been the same or have they changed? [*If changed:*] Why have they changed?

Q10.   Were/are you on track to meet 2016/2017 targets? [*If not on track, probe why not on track and how far behind are they in meeting their targets.*]

1.   Number of water kits distributed in each jurisdiction

2.   Number of kits distributed by customer segments – if applicable

3.   Cost of distributing the kits

4.   Anything else?

Q11.   How about savings targets? Are you on track to meet the savings targets in Carolinas, Progress, Ohio, Indiana, and Kentucky? If not, why not?

Q12.   Does the program have any process or non-impact goals? *(Probe: low-income, renter, or non-English speaking population targeting, increased kit recipient knowledge of how to save energy, etc.)*

[*IF YES:*]

1.   How are these goals established?

2.   How are they measured?

Communication

Q13.   Can you describe how your vendors communicate about the program with Duke Energy? Who do you communicate with, how often, and what about? Does this vary by jurisdiction?

Q14.   How often do you or vendors have to resolve an issue with kits? What types of issues come up?

Data Tracking of Kits

Let's talk about the kits a little bit.

Q15.   Were there any changes to the items in the small, medium, or large kit during 2016 and 2017 program year? Any changes for 2018 program year? Are these changes for all jurisdictions?

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Q16.   We heard that customers must complete a short survey/form to receive a kit. Would it be possible to receive/see this survey data?

Q17.   From the moment a customer requests a kit, how long does it take to receive a kit? Is this time frame typical in terms of how long it takes to receive a kit? [*IF NOT TYPICAL, PROBE to get more information on this topic.*] Does it vary by jurisdiction?

Q18.   Can you tell us how your vendor reports the number of kits sent out to customers to Duke Energy? Is there information on kit distribution that you need but are not getting? What?

We are almost done. I have a few more questions.

Tape Up

Q19.   What would you say are the greatest strengths of this program?

Q20.   What would you say is the biggest challenge in administering this program?

Q21.   How can this program be improved?

Q22.   Is there anything else about the program that we have not discussed that you feel should be mentioned?

Q23.   What would you like to learn from the program evaluation?

Those are all of my questions. Thank you very much for your time.

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D.2   Implementer Staff In-Depth Interview Guide

Introduction

[*Note: Opinion Dynamics staff will schedule calls ahead of time through email contact.*]

[*If needed:*] We are conducting an evaluation of Duke Energy Save Energy and Water Kit Program (SEWKP). Because your organization is involved with this program, we would like to get your perspective on how the program works to help guide us in our efforts.

I would like to record this interview for my note-taking purposes. Do I have your permission?

Roles & Responsibilities

Q1.   Can you describe your role in the SEWKP or water kit program?

Q2.   Can you describe your program processes? (From receipt of kit forms to notifying EFI to send kits)

Q3.   We have been told that your organization processes kit submission forms for Duke Energy water kit program. Do you provide any other services to Duke Energy?

   1.   Do you provide these services in all jurisdictions where this program is offered: Progress, Carolinas, Ohio, Indiana, and Kentucky?

Program Goals

Q4.   In jurisdictions where you are providing services to Duke Energy, do you know what are Duke Energy targets in terms of:

   1.   Number of water kits distributed
   2.   Cost of the kits
   3.   Education goals
   4.   Anything else?

Q5.   Do you know if Duke Energy is on track to achieve those targets? If so, how do you know?

Data Tracking of Kits and Eligibility

Q6.   Based on what we heard, households must complete a short survey/form to receive a kit. Do you track the information that is on the survey form in a database? If so, what exactly do you track?

   1.   Do you track the same information for each jurisdiction?

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2.   How do you report this information to Duke Energy?

3.   [*If not addressed:*] Do you maintain a dashboard that tracks number of kits and possibly other information. If so, can you send us a screen shot of that dashboard so we can see what is tracked on that dashboard?

4.   Could you provide us with one of the forms so we can see what participants are filling out?

Q7.   Can you describe to us who is eligible to receive the kit – that is, eligibility criteria? Do eligibility criteria vary by jurisdiction?

Q8.   Can you tell us what proportion of households who sent in a kit survey form were ineligible to receive a kit in 2016 in each jurisdiction? What are the most common reasons as to why customers are ineligible? Do you think the proportion of ineligible applications will increase in 2017? If so, why?

Q9.   From the moment households request a kit, do you know how long it takes to receive a kit? Is this time frame typical in terms of how long it takes to receive a kit? [*IF NOT TYPICAL, PROBE to get more information on this topic.*]

Q10.   What challenges have you encountered with processing of the kit forms? [*Probe about missing information or other errors.*] [*If challenges:*] What could be done to address these challenges? Any suggestions on how to change the form? Are some of these challenges more prevalent in certain jurisdictions? If so, why?

Q11.   How many forms, on average, do you process per week or annually?

Q12.   [*If not addressed:*] What demographic data do you collect from households that request the kits? Which demographic segments are more likely to request the kits? Does this vary by jurisdiction?

Communication

Q13.   Can you describe how you communicate with Duke Energy about the kit form submissions or anything else? Who do you communicate with, how often, and what about?

Q14.   Have there been any challenges in your interactions with Duke Energy? If so, what were they? How did you address them? Were they resolved? If not, what do you think might resolve them?

Tape Up

I have only a couple of more questions left.

Q15.   What would you say is the biggest challenge in processing kit submission forms and distributing kits? What could be done to improve this process?

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Q16.   Is there anything else about the program that we have not discussed that you feel should be mentioned?

Those are all of my questions. Thank you very much for your time.

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D.3   Participant Survey

Introduction/ Screening

[ASK FOR PHONE SURVEY]
Q1.   Hi, I'm _____, calling on behalf of Duke Energy. We are calling about the Save Energy and Water Kit you got from Duke Energy. This kit included faucet aerators, one or two showerheads, and pipe wrap that can help you save water and energy in your home. Do you recall receiving this kit?
1. Yes
2. No
98. Don't know
[IF NEEDED: Can I speak with someone who may know something about this kit?]
[IF NO KNOWLEDGEABLE CONTACT, THANK AND TERMINATE]

[ASK FOR WEB SURVEY]
Q2.   We are conducting surveys about the Save Energy and Water Kit you got from Duke Energy. This kit included faucet aerators, one or two showerheads, and pipe wrap that can help you save water and energy in your home. Do you recall receiving this kit?
1. Yes
2. No [TERMINATE]
3. Don't know [TERMINATE]

Motivation and Collateral

Q3.   [deleted]

Q4.   Did you read the included instructions on how to install the items that came in the kit?
1. Yes
2. No
98. Don't remember

[ASK IF Q3=1]
Q5.   [ASK IF 4=1] On a scale from 0 to 10, where 0 is not at all helpful and 10 is very helpful, how helpful were the instructions on how to install the items that came in the kit?
0. Not at all helpful
1.
2.
3.
4.
5.
6.
7.
8.
9.
10. Very helpful
98. Don't know

[ASK IF Q5<7]
Q6.   What might have made the instructions more helpful?
[RECORD VERBATIM ANSWER]

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Q7.   [deleted]
Q8.   [deleted]
Q9.   [deleted]

Assessing Measure Installation

[DISPLAY IF KIT_SIZE=SMALL:] We'd like to ask you about the energy and water saving items included in your kit. The kit contained a showerhead, faucet aerators for the bathroom and kitchen, and pipe wrap.

[DISPLAY IF KIT_SIZE=MEDIUM:] We'd like to ask you about the energy and water saving items included in your kit. The kit contained two showerheads, faucet aerators for the bathroom and kitchen, and pipe wrap.

Q10.   Have you or anyone else installed any of those items in your home, even if they were taken out later? [Interviewer: Throughout interview, remind respondent as needed to report whether someone else in the home installed or uninstalled any items]
1. Yes
2. No [SKIP TO Q23]
98. Don't know [TERMINATE]

[ASK IF Q10=1]
Q11.   Which of the items did you install, even if they were taken out later? [MULTIPLE RESPONSE]
        [Interviewer: Record each response, then prompt with the list items.]
1. Showerhead
2. Kitchen faucet aerator
3. Bathroom faucet aerator
4. Pipe wrap
98. I don't remember which items were installed [TERMINATE]

[ASK IF Q11=1 AND KIT_SIZE=MEDIUM]
Q12.   Your kit contained two showerheads. Did you install one or both of the showerheads in the kit, even if one or both were taken out later?
1. I installed both
2. I only installed one showerhead
98. Don't know

[ASK IF Q11=3]
Q13.   How many of the bathroom faucet aerators from the kit did you install in your home, even if one or more were taken out later?
1. One
2. Two
98. Don't know

[ASK IF Q11=4]
Q14.   Did you install all of the pipe insulation that was included with the kit?
1. Yes
2. No
98. Don't know

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[ASK IF Q11=4]
Q15. About how many feet of the hot water pipe exiting your water heater did you wrap with the insulation that came in the kit? Please go over to your water heater if you need to check.
1.   About three feet or less
2.   About four to five feet
3.   About six feet or more
98. Don't know

[ASK IF Q11=1,2,3,4]
Q16. Overall, how satisfied are you with the item(s) you installed? [0-10 SCALE FOR EACH; 98=DK]
[DISPLAY IF MODE=PHONE: Please use a 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied. How satisfied are you with...]
1.   [SHOW IF Q11=1] Showerhead
2.   [SHOW IF Q11=2] Kitchen faucet aerator
3.   [SHOW IF Q11=3] Bathroom faucet aerator
4.   [SHOW IF Q11=4] Pipe wrap

[ASK IF Q16_1<7 OR Q16_2<7 OR Q16_3<7 OR Q16_4<7]
Q16a. Can you please explain any dissatisfaction you had with the following measures?
[SHOW LIST OF Q16 ITEMS THAT WERE RATED LESS THAN 7]
[OPEN END: RECORD VERBATIM]

Q17. Overall, how satisfied are you with Duke Energy's Save Energy and Water Kit Program?
[DISPLAY IF MODE=PHONE: IF NEEDED: Please use that same 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied.]
0.   Very dissatisfied
1.
2.
3.
4.
5.
6.
7.
8.
9.
10. Very satisfied
98. Don't know

[ASK IF ANY PART OF Q11=1]
Q18. Have you (or anyone in your home) removed any of the items from the kit that you had previously installed?
1.   Yes
2.   No
98. Don't know

[ASK IF Q18=1]
Q19. Which of the items did you remove? [MULTIPLE RESPONSE]
Q19_1. [DISPLAY IF Q11_1=1] Showerhead[s]
Q19_2. [DISPLAY IF Q11_2=1] Kitchen faucet aerator
Q19_3. [DISPLAY IF Q11_3=1] Bathroom faucet aerator[s]
Q19_4. [DISPLAY IF Q11_4=1] Pipe wrap

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Q19_7. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q19=1 AND Q12=1]
Q20.   Did you remove one or both of the showerheads you had previously installed?
    1. I uninstalled both
    2. I only uninstalled one of the showerheads
    98. Don't know

[ASK IF Q19=3 AND Q13=2]
Q21.   How many bathroom faucet aerators did you remove?
    1. One
    2. Two
    98. Don't know

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[CALCULATE SHOWER:
IF Q12=1, THEN SHOWER=2;
IF Q12=2 OR (Q11_1=1 AND KIT_SIZE=SMALL), THEN SHOWER=1;
ELSE SHOWER=0]

[CALCULATE KITCH:
IF Q11_2=1, THEN KITCH=1, ELSE KITCH=0]

[CALCULATE BATH:
IF Q13=2, THEN BATH=2;
IF Q13=1, THEN BATH=1;
ELSE BATH=0]

[CALCULATE PIPE:
IF Q11_4=1, THEN PIPE=1, ELSE PIPE=0]

[CALCULATE SHOWER1:
IF SHOWER=1 AND Q19_1=1, THEN SHOWER1=0;
IF Q19_1=1 AND (Q20=1 OR Q20=98), THEN SHOWER1=0;
IF Q19_1=1 AND Q20=2, THEN SHOWER1=1;
ELSE SHOWER1=SHOWER]

[CALCULATE KITCH1:
IF Q19_2=1, THEN KITCH1=0;
ELSE KITCH1=KITCH]

[CALCULATE BATH1:
IF BATH=1 AND Q19_3=1, THEN BATH1=0;
IF Q19_3=1 AND (Q21=2 OR Q21=98), THEN BATH1=0;
IF Q19_3=1 AND Q21=1, THEN BATH1=1;
ELSE BATH1=BATH]

[CALCULATE PIPE1:
IF Q19_4=1, THEN PIPE1=0;
ELSE PIPE1=PIPE]

CALCULATE CALCTOTAL1:
[SHOWER1 + BATH1 + KITCHEN1 + PIPE1]

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[ASK IF Q19=1,2,3,4—REPEAT FOR EACH SELECTED ITEM]
Q22.   Why was the [Q19 SELECTION] removed? [MULTIPLE RESPONSE]
1.   It was broken
2.   I didn't like how it worked
3.   I didn't like how it looked, or
4.   Some other reason (please specify): [OPEN END]
98. Don't know

[ASK IF Q10=2 OR Q11_1=0 OR Q11_2=0 OR Q11_3=0 OR Q11_4=0]
Q23.   You said you haven't installed the following items. Which of the following do you plan to install in the next three months? [MULTIPLE RESPONSE]
1.   [SHOW IF Q10=2 OR Q11_1=0] Showerhead
2.   [SHOW IF Q10=2 OR Q11_2=0] Kitchen faucet aerator
3.   [SHOW IF Q10=2 OR Q11_3=0] Bathroom faucet aerator
4.   [SHOW IF Q10=2 OR Q11_4=0] Pipe wrap
96. I'm not planning to install any of these in the next three months [EXCLUSIVE ANSWER]
98. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q23_1=0 OR ((Q10=2 OR Q11_1=0) AND Q23_96=1)]
Q24_1.   What's preventing you from installing the showerhead(s)?
[Interviewer: do not read response options, code responses]
1.   Didn't know what that was
2.   Tried it, didn't fit
3.   Tried it, didn't work as intended (please specify): [OPEN-END]
4.   Haven't gotten around to it
5.   Current one is still working
6.   Takes too much time to install or too busy
7.   Too difficult to install it, don't know how to do it
8.   Don't have the tools I need
9.   Don't have the items any longer (threw away, gave away)
10. [SHOW FOR Q24_1] Already have efficient showerhead
96. Other (please specify): [OPEN END]
98. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q23_2=0 OR ((Q10=2 OR Q11_2=0) AND Q23_96=1)]
Q24_2.   What's preventing you from installing the showerhead(s)?
[Interviewer: do not read response options, code responses]
1.   Didn't know what that was
2.   Tried it, didn't fit
3.   Tried it, didn't work as intended (please specify): [OPEN END]
4.   Haven't gotten around to it
5.   Current one is still working
6.   Takes too much time to install or too busy
7.   Too difficult to install it, don't know how to do it
8.   Don't have the tools I need
9.   Don't have the items any longer (threw away, gave away)
11. [SHOW FOR Q24_2] Already have efficient kitchen faucet aerator
96. Other (please specify): [OPEN END]
98. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q23_3=0 OR ((Q10=2 OR Q11_3=0) AND Q23_96=1)]
          Q24_3. What's preventing you from installing the showerhead(s)?

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[Interviewer: do not read response options, code responses]
1. Didn't know what that was
2. Tried it, didn't fit
3. Tried it, didn't work as intended (please specify): [OPEN END]
4. Haven't gotten around to it
5. Current one is still working
6. Takes too much time to install or too busy
7. Too difficult to install it, don't know how to do it
8. Don't have the tools I need
9. Don't have the items any longer (threw away, gave away)
12. [SHOW FOR Q24_3] Already have efficient bathroom faucet aerators
96. Other (please specify): [OPEN END]
98. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q23_4=0 OR ((Q10=2 OR Q11_4=0) AND Q23_96=1)]
Q24_4.   What's preventing you from installing the showerhead(s)?
       [Interviewer: do not read response options, code responses]
1. Didn't know what that was
3. Tried it, didn't work as intended (please specify): [OPEN END]
4. Haven't gotten around to it
6. Takes too much time to install or too busy
7. Too difficult to install it, don't know how to do it
8. Don't have the tools I need
9. Don't have the items any longer (threw away, gave away)
13. Already have pipe wrap on my hot water pipe
96. Other (please specify): [OPEN END]
98. Don't know [EXCLUSIVE ANSWER]

Q24a. Customers that need additional assistance with their items can call a toll-free customer care hotline. Did you call the customer care hotline to seek assistance in installing any of your items?
1. Yes
2. No
98. Don't know

[ASK IF Q24A=1]
Q24b. Did you call the customer care hotline to seek assistance in installing your kitchen faucet aerator?
1. Yes
2. No
98. Don't know

[ASK IF Q24B=1]
Q24c. Did the customer care hotline offer to send you an adapter for the kitchen faucet aerator?
1. Yes
2. No
98. Don't know

[ASK IF Q24A=1]
Q24d. Did you call the customer care hotline to seek assistance in installing your bathroom faucet aerator?
       1.   Yes

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2. No
98. Don't know

[ASK IF Q24D=1]
Q24e. Did the customer care hotline offer to send you an adapter for the bathroom faucet aerator?
1. Yes
2. No
98. Don't know

Q25. [deleted]
Q26. [deleted]
Q27. [deleted]
Q28. [deleted]

[ASK IF SHOWER1 > 0]
Q29. On average, what is the typical shower length in your household?
1. One minute or less
2. Two to four minutes
3. Five to eight minutes
4. Nine to twelve minutes
5. Thirteen to fifteen minutes
6. Sixteen to twenty minutes
7. Twenty-one to thirty minutes
8. More than thirty minutes
98. Don't know

[ASK IF SHOWER1 > 0]
Q30. [DISPLAY IF SHOWER1=2] Thinking of the efficient showerhead you installed that gets the most usage, on average, how many showers per day are taken in this shower?
[DISPLAY IF SHOWER1=1] Thinking of the efficient showerhead currently installed in your home, on average, how many showers per day are taken in this shower?
1. Less than one
2. One
3. Two
4. Three
5. Four
6. Five
7. Six
8. Seven
9. Eight or more
98. Don't know

[ASK IF SHOWER1=2]
Q31. Thinking of the other efficient showerhead you installed, on average, how many showers per day are taken in this shower?
1. Less than one
2. One
3. Two
4. Three
5. Four
6. Five
7.   Six

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8. Seven
9. Eight or more
98. Don't know

Q32.   [This question was moved to demographics section – but not renumbered for programming purposes]

NTG

[SKIP TO Q40 IF CALCTOTAL1=0]

Q33.   If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?
1. Yes
2. No
4. Don't know

[ASK IF Q33=1]
Q34.   What items would you have purchased and installed within the next year? [MULTIPLE RESPONSES]
Q34_1. [IF SHOWER1 > 0] Energy-efficient showerhead[s]
Q34_2. [IF KITCH1 > 0] Energy-efficient kitchen faucet aerator
Q34_3. [IF BATH1 > 0] Energy-efficient bathroom faucet aerator[s]
Q34_4. [IF PIPEWRAP1 > 0] Pipe wrap
Q34_7. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q34_1=1 AND SHOWER1=2]
Q35.   If you had not received them in your free kit, how many energy-efficient showerheads would you have purchased and installed within the next year?
1. One
2. Two
98. Don't know

[ASK Q36 IF Q34_3=1 AND BATH1=2]
Q36.   If you had not received them in your free kit, how many energy-efficient bathroom aerators would you have purchased and installed within the next year?
1. One
2. Two
98. Don't know

Q37.   Now, thinking about the energy and water savings items that were provided in the kit - using a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," how influential were the following factors on your decision to install the items from the kit? How influential was… [0-10 SCALE FOR EACH; 98=DK]
1. The fact that the items were free
2. The fact that the items were mailed to your house
3. Information provided by Duke Energy about how the items would save energy and water
0. Other information or advertisements from Duke Energy, including its website

Q38.   [DELETED]
Q39.   [DELETED]

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Q40.   Since receiving your kit from Duke Energy, have you purchased and installed any other products or made any improvements to your home to help save energy?
1. Yes
2. No
98. Don't know

[ASK Q41 IF Q40=1]
Q41.   What products have you purchased and installed to help save energy in your home?
[MULTIPLE RESPONSE]
[INTERVIEWER: Do not read list. After each response, ask, "Anything else?"]
4. Bought energy efficient appliances
5. Moved into an ENERGY STAR home
6. Bought efficient heating or cooling equipment
7. Bought efficient windows
8. Added insulation
9. Sealed air leaks in windows, walls, or doors
10. Sealed or insulated ducts
11. Bought LEDs
12. Bought CFLs
13. Installed an energy efficient water heater
15. Other (please specify): [OPEN END]
96. None – no other actions taken [EXCLUSIVE ANSWER]
98. Don't know [EXCLUSIVE ANSWER]

[ASK IF Q41=5]
Q42.   Is Duke Energy still your gas or electricity utility?
1. Yes
2. No
98. Don't know

Q43.   [DELETED]
Q44.   [DELETED]
Q45.   [DELETED]

[ASK IF Q41=4,5,6,7,8,9,10,11,12,13,15—REPEAT FOR EACH SELECTED ITEM]
Q46.   On a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential", how much influence did the Duke Energy Save Energy and Water Kit Program have on your decision to… [0-10 SCALE FOR EACH; 98=DK]
4. [IF Q41=4] Buy energy efficient appliances
5. [IF Q41=5] Move into an ENERGY STAR home
6. [IF Q41=6] Buy efficient heating or cooling equipment
7. [IF Q41=7] Buy efficient windows
8. [IF Q41=8] Add insulation
9. [IF Q41=9] Seal air leaks in windows, walls, or doors
10. [IF Q41=10] Seal or insulate ducts
11. [IF Q41=11] Buy LEDs
12. [IF Q41=12] Buy CFLs
13. [IF Q41=13] Install an energy efficient water heater
15. [IF Q41=15] [Q41_15 OPEN END RESPONSE]

[ASK IF Q41=4 AND 46_4 > 0]
Q47.   What kinds of appliance(s) did you buy? [MULTIPLE RESPONSE]
[Do not read list]

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1. Refrigerator
2. Stand-alone Freezer
3. Dishwasher
4. Clothes washer
5. Clothes dryer
6. Oven
7. Microwave
0. Other (please specify): [OPEN END]
98. Don't know

[ASK IF Q47=1,2,3,4,5,7,0—REPEAT FOR EACH SELECTED ITEM]
Q48. Was the [INSERT Q47 RESPONSE] an ENERGY STAR or high-efficiency model?
1. Yes
2. No
98. Don't know
99. Refused

[ASK IF Q47=5]
Q49. Does the new clothes dryer use natural gas?
1. Yes - it uses natural gas
2. No – does not use natural gas
98. Don't know

[ASK IF Q41=6 AND Q46_6 > 0]
Q50. What type of heating or cooling equipment did you buy?
[MULTIPLE RESPONSE] [Do not read list]
4. Central air conditioner
5. Window/room air conditioner unit
6. Wall air conditioner unit
7. Air source heat pump
8. Geothermal heat pump
9. Boiler
10. Furnace
11. Wi-fi thermostat
12. Other (please specify): [OPEN END]
98. Don't know

[ASK IF Q50=9 OR 10]
Q51. Does the new [INSERT Q50 RESPONSE] use natural gas?
1. Yes – it uses natural gas
2. No – does not use natural gas
98. Don't know

[ASK IF Q50=4,5,6,7,8,9,10,12—REPEAT FOR EACH SELECTED ITEM]
Q52. Was the [INSERT Q50 RESPONSE] an ENERGY STAR or high-efficiency model?
1. Yes - it is an ENERGY STAR or high-efficiency model
2. No - it is not an ENERGY STAR or high-efficiency model
98. I don't know if it is an ENERGY STAR or high-efficiency model

[ASK IF Q41=7 AND Q46_7 > 0]
Q53. Do you know how many windows you installed??
1. Yes (please specify how many you installed in the box below)
[NUMERIC RESPONSE 1 – 100]

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2. No

[ASK IF Q41=8 AND Q46_8 > 0]

Q54.   Please let us know what spaces you added insulation to. Also, let us know the proportion of each space for which you added insulation (for example, if you added insulation that covered your entire attic space, you would type in 100%).
1.   Attic [NUMERIC RESPONSE 0 – 100]%
2.   Walls [NUMERIC RESPONSE 0 - 100]%
3.   Below the floor [NUMERIC RESPONSE 0 – 100]%

[ASK IF Q41= 11 AND Q46_11 > 0]

Q55.   Do you know how many LEDs you installed at your property?
1.   Yes (please specify how many you installed in the box below)
[NUMERIC RESPONSE 1 – 100]
2.   No

[ASK IF Q41=12 AND Q46_12 > 0]

Q56.   Do you know how many CFLs you installed at your property?
1.   Yes (please specify how many you installed in the box below)
[NUMERIC RESPONSE 1 – 100]
2.   No

[ASK IF Q41=13 AND Q46_13 > 0]

Q57.   Does the new water heater use natural gas?
1.   Yes – it uses natural gas
2.   No – does not use natural gas
98. Don't know

[ASK IF Q41= 13. AND Q46_13 > 0]

Q58.   Which of the following water heaters did you purchase?
1.   A traditional water heater with a large tank that holds the hot water
2.   A tankless water heater that provides hot water on demand
3.   A solar water heater
0.   Other (please specify): [OPEN END]
98. Don't know

[ASK IF Q41= 13 AND Q46_13 > 0]

Q59.   Is the new water heater an ENERGY STAR model?
1.   Yes
2.   No
98. Don't know

Demographics

Q60.   Which of the following types of housing units would you say best describes your home?
1.   Single-family detached house
2.   Single-family attached home (such as a townhouse or condo)
3.   Duplex, triplex or four-plex
4   Apartment or condominium with 5 units or more
5.   Manufactured or mobile home
0.   Other (please specify): [OPEN END]
98. Don't know

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Q61.   How many showers are in your home? Please include both stand-up showers and bathtubs with showerheads.
1. One
2. Two
3. Three
4. Four
5. Five or more
98. Don't know

Q62.   How many bathroom sink faucets are in your home? (Keep in mind that some bathrooms may have multiple bathroom sink faucets in them)
1. One
2. Two
3. Three
4. Four
5. Five
6. Six
7. Seven
8. Eight or more
98. Don't know

Q63.   How many kitchen faucets are in your home?
1. One
2. Two
3. Three
4. Four or more
98. Don't know

[ASK IF Q63=2,3,4]
Q63a. You mentioned that you have more than one kitchen faucet. Where is/are your other kitchen faucet(s) located in your home?
[OPEN-ENDED: RECORD VERBATIM RESPONSE]

Q32. What fuel type does your water heater use?
1. Electric
2. Natural Gas
3. Other (please specify): [OPEN END]
4. Don't know

Q64.   How many square feet of living space are there in your residence, including bathrooms, foyers and hallways (exclude garages, unfinished basements, and unheated porches)?
1. Less than 500 square feet
2. 500 to under 1,000 square feet
3. 1,000 to under 1,500 square feet
4. 1,500 to under 2,000 square feet
5. 2,000 to under 2,500 square feet
6. 2,500 to under 3,000 square feet
7. Greater than 3,000 square feet
98. Don't know
99. Prefer not to say

Q65.   Do you or members of your household own your home, or do you rent it?
1.   Own / buying

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    2. Rent / lease
    3. Occupy rent-free
    98. Don't know
    99. Prefer not to say

Q66.   Including yourself, how many people currently live in your home year-round?
    1. I live by myself
    2. Two people
    3. Three people
    4. Four people
    5. Five people
    6. Six people
    7. Seven people
    8. Eight or more people
    98. Don't know
    99. Prefer not to say

Q67.   What was your total annual household income for 2018, before taxes?
    1. Under $20,000
    2. 20 to under $30,000
    3. 30 to under $40,000
    4. 40 to under $50,000
    5. 50 to under $60,000
    6. 60 to under $75,000
    7. 75 to under $100,000
    8. 100 to under $150,000
    9. 150 to under $200,000
    10. $200,000 or more
    98. Don't know
    99. Prefer not to say

Q68.   What is the highest level of education achieved among those living in your household?
    1. Less than high school
    2. Some high school
    3. High school graduate or equivalent (such as GED)
    4. Trade or technical school
    5. Some college (including Associate degree)
    6. College degree (Bachelor's degree)
    7. Some graduate school
    8. Graduate degree, professional degree
    9. Doctorate
    98. Don't know
    99. Prefer not to say

Q69.   Finally, what is your year of birth?
    [Scroll box with years 1900-2011; 9998=Prefer not to say]

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Appendix E   DEC Participant Survey Results

This section reports the results from each question in the DEC participant survey. Since the results reported in this appendix represent the "raw" data (that is, none of the open-ended responses have been coded and none of the scale questions have been binned), some values may be different from those reported in the Process Evaluation Findings chapter (particularly: percentages in tables with "Other" categories and scale response questions). Only respondents who completed the survey are included in the following results.

Q1.   [Read if mode = phone] Hi, I'm _____ , calling on behalf of Duke Energy. We are calling about the Save Energy and Water Kit you got from Duke Energy.

This kit included faucet aerators, one or two showerheads, and pipe tape that can help you save water and energy in your home. Do you recall receiving this kit?

Response Option	Percent (n=35)
Yes	100%
No	0%
Don't know	0%

Q2.   [Display if mode = web] We are conducting surveys about the Save Energy and Water Kit you got from Duke Energy. This kit included faucet aerators, one or two showerheads, and pipe tape that can help you save water and energy in your home.

Do you recall receiving this kit?

Response Option	Percent (n=285)
Yes	100%
No	0
Don't know	0

Q3.   DELETED

Q4.   Did you read the included instructions on how to install the items that came in the kit?

Response Option	Percent (n=320)
Yes	85%
No	10%
Don't remember	5%

Q5.   [Ask if Q4 = YES] On a scale from 0 to 10, where 0 is not at all helpful and 10 is very helpful, how helpful were the instructions on how to install the items that came in the kit?

Response Option	Percent (n=272)
0- Not at all helpful	0%
1	0%
2	0%
3	0%
4	0%

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5	3%
6	5%
7	9%
8	15%
9	18%
10 - Very helpful	48%
Don't Know	2%

Q6.   [Ask if Q5<7] What might have made the instructions more helpful?

Verbatim Response	Count (n=22)
They were fine	1
They said everything very well	1
There were no washers that were talked about in the instructions just teflon tape and no directions to use the tape.	1
step-by-step diagram for the show head installation	1
Specific use case or online video tutorials for individuals that are less likely to apply the items in the kit in the correct manner.	1
sheesh	1
Nothing, I know how to install	1
Nothing that remember. They went helpful to me because I already knew how to use the things that came.	1
Nothing	3
not sure	1
Na	1
More thoroughness	1
More diagrams	1
More details	1
Little more detail or more pics	1
Did not understand at all how to install would have had to call a plumber	1
Clear talk	1
Better pictures	1
Basic pin points	1
A little more simplified.	1

Q7.   DELETED

Q8.   DELETED

Q9.   DELETED

Q10.   Have you or anyone else installed any of those items in your home, even if they were taken out later?

Response Option	Percent (n=320)
Yes	79%
No	21%
Don't Know	0%

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Q11.   [Ask if Q10 = YES] Which of the items did you install, even if they were taken out later?

Response Option	Percent (n=254)*
Showerhead	80%
Kitchen faucet aerator	56%
Bathroom faucet aerator	58%
Pipe tape	45%
I don't remember	0%

*Multiple responses were allowed for this question

Q12.   [Ask if Q11 = SHOWERHEAD AND KIT_SIZE= MEDIUM] Your kit contained two showerheads. Did you install one or both of the showerheads in the kit, even if one or both were taken out later?

Response Option	Percent (n=77)
I installed both	55%
I only installed one showerhead	46%
Don't know	0%

Q13.   [Ask if Q11 = BATHROOM FAUCET AERATOR] How many of the bathroom faucet aerators from the kit did you install in your home, even if one or more were taken out later?

Response Option	Percent (n=146)
One	56%
Two	41%
Don't know	3%

Q14.   [Ask if Q11 = PIPEWRAP] Did you install all of the pipe insulation that was included with the kit?

Response Option	Percent (n=116)
Yes	74%
No	21%
Don't know	5%

Q15.   [Ask if Q14 is displayed] About how many feet of the pipe extruding from your water heater did you tape with the insulation **that came in the kit**? Please go over to your water heater if you need to check.

Response Option	Percent(n=116)
About three feet or less	39%
About four to five feet	24%
About six feet or more	10%
Don't know	27%

Q16.   [Ask if any part of Q11 = YES] Overall, how satisfied are you with the item[s] you installed?

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Showerhead

Response Option	Percent (n=202)
0 - Very dissatisfied	2%
1	1%
2	1%
3	1%
4	1%
5	4%
6	3%
7	11%
8	13%
9	11%
10 - Very satisfied	54%
Don't know	1%

Kitchen Faucet Aerator

Response Option	Percent (n=142)
0 – Very dissatisfied	2%
1	0%
2	4%
3	0%
4	0%
5	5%
6	3%
7	11%
8	13%
9	11%
10 - Very satisfied	50%
Don't know	1%

Bathroom Faucet Aerator

Response Option	Percent (n= 146)
0 – Very dissatisfied	2%
1	0%
2	1%
3	2%
4	1%
5	4%
6	3%
7	11%
8	16%
9	11%
10 - Very satisfied	49%
Don't know	1%

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Pipe Tape

Response Option	Percent (n= 116)
0 – Very dissatisfied	0%
1	0%
2	0%
3	1%
4	0%
5	3%
6	2%
7	10%
8	10%
9	11%
10 - Very satisfied	59%
Don't know	4%

Q16a. Can you please explain any dissatisfaction you had with [DISPLAY ALL ITEMS IN Q16 THAT ARE <7]?

Showerhead

Verbatim Response	Count (n=21)
Was smaller than I prefer	1
Very low pressure decreases the enjoyment of a shower	1
They didnt make any difference	1
sheesh	1
Reduced pressure	1
Pressure changes during shower	1
Options	1
Not very strong pressure.	1
None	1
No water pressure at all. How are you supposed to shower with that??	1
no dissatisfaction	1
It reduced the pressure to the point of making the experience unenjoyable.	1
It had very little water pressure.	1
it does not fit my hand held device	1
It does not allow enough water flow.	1
I ordered the upgraded shower head with hose The hose is too short to comfortably spray yourself off I have stand very close and barely more to keep from tugging on the hose The head seems to high It can not be adjusted to hang lower Also the material the	1
Even for my kids it was to reduced amount of flow to adequately rinse off.	1
does not fit well with shower wand.	1
difficult to put own; also have two bathrooms, one that's not being used	1
Didn't have any	1

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Did not let enough water through, Limited the flow	1

Kitchen Faucet Aerator

Verbatim Response	Count (n=19)
Worked OK but not excited about it.	1
water didn't have enough pressure while use the filter, I guess wasn't good enough.	1
Takes forever for the water to heat up due to decreased flow.	1
sheesh	1
Reduced pressure	1
none	1
It's ok looks cheap I like products that look good and last a long time	1
It would not work as it should, and did not fit the faucet exactly.	1
It would make the water come at a good flow, got molded, would fall often	1
It seemed much louder than the original.	1
It has a continuous spray and sometimes I would like it to not have a continuous spray, just a regular spray	1
It doesn't do very well when you have sediment in your pipe lines (currently working on having the sediment taken care of)	1
I like to have a water filter on my sink	1
Hard to change from normal to shower flow	1
Didnt make a difference	1
Did not let enough water through, Limited the flow	1
Did not fit spigot	1
Did not fit our delta faucet	1
Broke	1

Bathroom Faucet Aerator

Verbatim Response	Count (n=18)
would not screw on straight, constant leak	1
Would not connect to faucet correctly.	1
Takes forever for the water to heat up.	1
same as the other	1
same as the kitchen filter problems in the kit	1
Reduced pressure	1
Not enough water coming out for me	1
None	1
n/a	1
Lose water pressure	1
it works fine	1

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I didn't notice any difference	1
flow too restrictive. I know it has to be, but it just wasn't sufficient	1
Fair	1
Drastically reduces the water pressure	1
Didnt make a difference	1
Did not let enough water through, Limited the flow	1
Broke	1

Pipe tape

Verbatim Response	Count (n=7)
Not enough provided	1
None	2
It deteriorated after two years.	1
I used that type wrap before and can't say it is much good.	1
DIDNT STICK	1
All good	1

Q17.   Overall, how satisfied are you with Duke Energy's Save Energy and Water Kit Program?

Response Options	Percent (n=254)
0 - Very dissatisfied	1%
1	0%
2	1%
3	1%
4	3%
5	4%
6	8%
7	11%
8	15%
9	57%
10 - Very satisfied	0%
Don't know	1%

Q18.   [Ask if any part of Q11 = YES] Have you (or anyone in your home) uninstalled any of the items from the kit that you had previously installed?

Response Option	Percent (n=254)
Yes	15%
No	82%
Don't know	4%

Q19.   [Ask if Q18 = YES] Which of the items did you uninstall?

Response Option	Count (n= 37)*
Showerhead	24

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Kitchen faucet aerator	17
Bathroom faucet aerator	9
Pipe tape	1
Don't know	1

*Multiple responses were allowed for this question

Q20.   [Ask if Q19 = SHOWERHEAD and Q12 = INSTALLED BOTH] Did you uninstall one or both of the showerheads you had previously installed?

Response Option	Percent (n=2)
I uninstalled both	0%
I only uninstalled one of the showerheads	100%
Don't know	0%

Q21.   [Ask if Q19 = BATHROOM FAUCET AERATOR and Q13 = 2-4] How many bathroom faucet aerators did you uninstall?

Response Option	Percent (n=2)
One	50%
Two	50%
Don't know	0%

Q22.   [Ask if any item of Q19 is selected] Why were those items uninstalled?

Showerhead

Response Option	Percent (n=26)*
It was broken	0%
Didn't like how it worked	50%
Didn't like how it looked	4%
Other	46%
Don't know	8%

*Multiple responses were allowed for this question

Verbatim "Other" Responses	Count (n=12)
Too small	1
the well water had calcium build up on it	1
The flow is more reduced than I like (I have very long, thick hair). I am trying another low flow for another 30 days before deciding which to leave on.	1
Remodel to complete sustem	1
NO WATER PRESSURE	1
Itdid not remove	1
It got clogged up.	1
it does not fit my hand held	1
It did not fit very well	1
I got one that is larger	1

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Hard water caused deposits to clog	1
Didnt make a difference	1

Kitchen faucet aerator

Response Options	Percent (n=17)*
It was broken	6%
Didn't like how it worked	53%
Didn't like how it looked	12%
Other	24%
Don't know	6%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=5)
the well water had calcium build up on it	1
new faucet and it would not fit	1
It made the water flow loud.	1
Didnt make difference	1
Didn't fit	1

Bathroom faucet aerator

Response Options	Percent (n=9)*
It was broken	0%
Didn't like how it worked	89%
Didn't like how it looked	0%
Other	11%
Don't know	0%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=2)
My water has rust (iron) particles that embed in the aerator and close it off.	1
Didnt make difference	1

Pipe tape

Response Options	Percent (n=1)*
It was broken	100%
Didn't like how it worked	0%
Didn't like how it looked	0%
Other	0%
Don't know	0%

*Multiple responses were allowed for this question

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Q23.   [Ask if any items not selected in Q11 or Q10 = NO] You said you haven't installed the following items. Which of the following do you plan to install in the next three months?

Response Option	Percent (n=256)*
Showerhead	29%
Kitchen faucet aerator	32%
Bathroom faucet aerator	34%
Pipe tape	31%
I'm not planning on installing any of these in the next three months	26%
Don't know	27%

*Multiple responses were allowed for this question

Q24.   [Ask if any 1-6 options were not selected in Q23 or option "none" was selected] What's preventing you from installing those items?

Showerhead

Response Option	Percent (n=72)*
Already have an efficient showerhead	32%
Current one is still working	40%
Tried it, didn't fit	4%
Too difficult to install it, don't know how to do it	6%
Takes too much time to install it / No time / Too busy	0%
Tried it, didn't work as intended (please explain in the box below)	0%
Don't have the items any longer (threw away, gave away)	0%
Haven't gotten around to it	11%
Don't have the tools I need	1%
Didn't know what that was	0%
Other	13%
Don't know	1%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=9)
We have a shower head that is removable. We won't be switching to any other kinds.	1
We have a rainshower shower head and LOVE it. The sink part doesn't work with our fancy faucet in the kitchen.	1
We don't have a shower.	1
too narrow, my wife likes the wide showerheads because they water isn't as harsh.	1
Need one with hose so I can wash my dogs	1
Need movable shower head with handheld option.	1
I have installed	1
end up taking longer showers so it seems i actually use more water with this type.	1
don't have help	1

Kitchen faucet aerator

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Response Option	Percent (n=111)*
Tried it, didn't fit	18%
Current one is still working	23%
Already have an efficient kitchen faucet aerator	20%
Haven't gotten around to it	22%
Didn't know what that was	5%
Tried it, didn't work as intended (please explain in the box below)	1%
Too difficult to install it, don't know how to do it	3%
Takes too much time to install it / No time / Too busy	1%
Don't have the items any longer (threw away, gave away)	0%
Don't have the tools I need	0%
Other	6%
Don't know	8%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=16)
No applicable to my installation.	1
need a new kitchen faucet	1
it was the wrong thread It was male I needed female	1
I'll have to read the instructions again.	1
I have a water purification system	1
I don't know if it will work on the faucets I have in my kitchen & bath	1
I didn't receive that	1
Have portable dishwasher that has specific connection on sink.	1
Have an extender attached with spray features doesn't fit	1
Have a combo sprayer style kitchen faucet, so this will not fit on our existing fixture.	1
Don't have one	1
don't know if I need it	1
Does not fit with my faucet type.	1
didn't get tape	1
Buying a new faucet soon.	1
Bought a new system for kitchen	1

Bathroom Faucet Aerator

Response Option	Percent (n=105)*
Tried it, didn't fit	16%
Haven't gotten around to it	31%
Current one is still working	16%
Already have an efficient bathroom faucet aerator	12%
Didn't know what that was	5%
Takes too much time to install it / No time / Too busy	0%
Don't have the items any longer (threw away, gave away)	0%

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Too difficult to install it, don't know how to do it	6%
Tried it, didn't work as intended (please explain in the box below)	1%
Don't have the tools I need	2%
Other	5%
Don't know	8%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=11)
Will not fit the Moen bathroom fixtures we have, aerator thread pattern doesn't match-up.	1
need one in the 1/2 bath. haven't gotten to it yest	1
It does not match mycurrent style o color	1
I've been sick,still under Dr's care and need somebody to do ot for me	1
I'm not sure if it will work with my faucet	1
I needed the female threads not the male	1
I didn't get it in my box	1
Going to remodel soon	1
Faucet is decorative and this does not look right	1
Don't have one	1
don't know if I need it	1

Pipe Tape

Response Option	Percent (n=130)*
Haven't gotten around to it	37%
Already have pipe tape on my hot water pipe	34%
Didn't know what that was	11%
Too difficult to install it, don't know how to do it	6%
Takes too much time to install it / No time / Too busy	2%
Don't have the items any longer (threw away, gave away)	0%
Tried it, didn't work as intended (please explain in the box below)	1%
Don't have the tools I need	2%
Other	6%
Don't know	9%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=16)
There isn't enough tape to wrap enough pipe to make it worthwhile	1
Physically unable to get to pipes.	1
no need for it the crawl space is insulated and sealed up good	1
Nice	1
Need to replace water heater soon. Waiting to get new one.	1
my aerators don't need to be replace yet.	1
I hurt too much to crawl around under the house.	1

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I don't know if I need the pipe wrap we haven't had cold weather, extreme enough to burst pipes	1
I didn't receive pipe wrap	1
I already have pipe wrap	1
Haven't needed it yet, already have the foam slip on kind	1
Don't have access to these pipes in our apartment.	1
Don't need pipe wrap	1
DON'T KNOW WHAT TO DO WITH IT	1
Didnt know. What it was for but know now and will wrap my hot water pipe	1
Didnt get around to it.	1

Q24a. Customers that need additional assistance with their items can call a toll-free customer care hotline. Did you call the customer care hotline to seek assistance in installing any of your items?

Response Option	Percent (n=320)
Yes	1%
No	98%
Don't know	1%

Q24b. [ASK IF Q24a = 1] Did you call the customer care hotline to seek assistance in installing your kitchen faucet aerator?

Response Option	Percent (n=2)
Yes	0%
No	100%
Don't know	0%

Q24c. [ASK IF Q24b = 1] Did the customer care hotline offer to send you an adapter for the kitchen faucet aerator?

[No valid responses]

Q24d. [ASK IF Q24a = 1] Did you call the customer care hotline to seek assistance in installing your bathroom faucet aerator?

Response Option	Percent (n=2)
Yes	0%
No	100%
Don't know	0%

Q24e. [ASK IF Q24d = 1] Did the customer care hotline offer to send you an adapter for the bathroom faucet aerator?

[No valid responses]

Q25. DELETED

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Q26.   DELETED

Q27.   DELETED

Q28.   DELETED

Q29.   [Ask if Q11 = SHOWERHEAD and at least one showerhead is still installed] On average, what is the typical shower length in your household?

Response Option	Percent (n=180)
One minute or less	1%
Two to four minutes	9%
Five to eight minutes	37%
Nine to twelve minutes	32%
Thirteen to fifteen minutes	12%
Sixteen to twenty minutes	5%
Twenty-one to thirty minutes	2%
More than thirty minutes	1%
Don't know	1%

Q30.   [DISPLAY IF TWO SHOWERHEADS STILL INSTALLED: Thinking of the efficient showerhead you installed that gets the most usage…]

[DISPLAY IF ONE SHOWERHEAD STILL INSTALLED: Thinking of the efficient showerhead currently installed in your home…]

On average, how many showers per day are taken in this shower?

Response Option	Percent (n=180)
Less than one	4%
One	38%
Two	42%
Three	10%
Four	3%
Six	1%
Seven	1%
Eight or more	1%
Don't know	4%

Q31.   [Ask if two showerheads still installed] Thinking of the other efficient showerhead you installed…

On average, how many showers per day are taken in this shower?

Response Option	Percent (n=40)
Less than one	28%
One	38%
Two	23%

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Three	5%
Four	3%
Five	0%
Six	0%
Seven	0%
Eight or more	3%
Don't know	3%

Q32.   What fuel type does your water heater use?

Response Option	Percent (n=320)
Electric	86%
Natural gas	11%
Other (please specify in the box below)	1%
Don't know	2%

Q33.   [Ask if any item was selected in Q11 and it's not the case that all parts of Q19 are selected (that is, they installed anything and did not uninstall everything they installed)] If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

Response Option	Percent (n=243)
Yes	22%
No	52%
Don't know	26%

Q34.   [Ask if Q33 = YES] What items would you have purchased and installed within the next year?

Response Option	Count (n=54)*
Showerhead	30
Kitchen faucet aerator	21
Bathroom faucet aerator	14
Pipe tape	15
Don't know	5

*Multiple responses were allowed for this question

Q35.   [Ask if Q34 = SHOWERHEAD and two showerheads are still installed] If you had not received them in your free kit, how many energy-efficient showerheads would you have purchased and installed within the next year?

Response Option	Percent (n=9)
One	33%
Two	67%
Don't know	0%

Q36.   [Ask if Q34 = BATHROOM FAUCET AERATOR and if more than one bathroom aerator is still installed] If you had not received them in your free kit, how many energy-

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efficient bathroom aerators would you have purchased and installed within the next year?

Response Option	Percent (n=9)
One	33%
Two	67%
Don't know	0%

Q37. [If Q33 was displayed] Now, thinking about the energy and water savings items that were provided in the kit - using a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," how influential were the following factors on your decision to install the items from the kit? *How influential was…*

The fact that the items were free

Response Option	Percent (n=243)
0- Not at all influential	2%
1	0%
2	0%
3	0%
4	1%
5	3%
6	3%
7	2%
8	8%
9	13%
10 - Extremely influential	69%
Don't know	0%

The fact that the items were mailed to your home

Response Option	Percent (n=243)
0- Not at all influential	1%
1	0%
2	0%
3	0%
4	0%
5	1%
6	2%
7	4%
8	7%
9	14%
10 - Extremely influential	70%
Don't know	1%

Information provided by Duke Energy about how the items would save energy and water

Response Option	Percent (n=243)
0- Not at all influential	2%
1	0%

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2	0%
3	0%
4	0%
5	6%
6	5%
7	5%
8	9%
9	13%
10 - Extremely influential	58%
Don't know	1%

Other information or advertisements from Duke Energy, including its website

Response Option	Percent (n=243)
0- Not at all influential	9%
1	1%
2	2%
3	3%
4	5%
5	8%
6	3%
7	5%
8	11%
9	14%
10 - Extremely influential	32%
Don't know	%

Q38.   DELETED

Q39.   DELETED

Q40.   Since receiving your kit from Duke Energy, have you purchased and installed any other **products** or made any improvements to your home to help save energy?

Response Option	Percent (n=320)
Yes	37%
No	58%
Don't know	5%

Q41.   [If Q40 = YES] What **products** have you purchased and installed to help save energy in your home?

Response Option	Percent (n=118)*
Bought energy efficient appliances	42%
Moved into an ENERGY STAR home	0%
Bought efficient heating or cooling equipment	16%
Bought efficient windows	10%
Added insulation	23%
Sealed air leaks in windows, walls, or doors	38%

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Sealed or insulated ducts	11%
Bought LEDs	66%
Bought CFLs	16%
Installed an energy efficient water heater	15%
None – no other actions taken	0%
Other	13%
Don't know	0%

*Multiple responses were allowed for this question

Verbatim Other Responses	Count (n=15)
water filtration system	1
smart thermostat	1
smart thermostat	1
Programmable thermostat	1
new thermostat	1
New roof	1
Nest thermostat	1
more pipe wrap in the garage to the hot water tap out there.	1
Installed new kitchen faucet.	1
Installed a metal roof	1
Got Led bulbs from Duke Energy	1
gas stove	1
Fuxxed the leaking water pipe	1
bought more insulation for the water heater pipe	1
Bought 2 nest thermostats	1

Q42.   [If Q41 = MOVED INTO AN ENERGY STAR HOME] Is Duke Energy still your gas or electricity utility?

Response Option	Count (n=320)
Yes	0
Not asked	320

Q43.   DELETED

Q44.   DELETED

Q45.   DELETED

Q46.   [Ask if any item in Q41 was selected] On a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential", how much influence did the Duke Energy Save Energy and Water Kit Program have on your decision to…

	0	1	2	3	4	5	6	7	8	9	10	Don't Know	Total (n)
Buy energy efficient appliances	14%	2%	0%	6%	4%	6%	4%	14%	4%	8%	36%	2%	50
Move into an	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0

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ENERGY STAR home													
Buy efficient heating or cooling equipment	16%	0%	0%	5%	5%	5%	0%	16%	0%	11%	42%	0%	19
Buy efficient windows	25%	0%	0%	8%	8%	0%	8%	8%	8%	8%	25%	0%	12
Add insulation	19%	4%	0%	7%	0%	4%	4%	4%	15%	15%	30%	0%	27
Seal air leaks	11%	2%	0%	0%	2%	4%	2%	9%	11%	20%	38%	0%	45
Seal ducts	8%	0%	0%	8%	0%	0%	0%	8%	15%	15%	46%	0%	13
Buy LEDs	15%	1%	0%	5%	1%	9%	5%	5%	8%	12%	37%	1%	78
Buy CFLs	5%	0%	0%	5%	0%	21%	5%	11%	5%	5%	42%	0%	19
Install an energy efficient water heater	28%	6%	0%	6%	11%	0%	6%	0%	0%	6%	28%	11%	18
Other	27%	0%	0%	7%	0%	7%	7%	7%	7%	0%	40%	0%	4

Q47. [Ask if Q41 = BOUGHT ENERGY EFFICIENT APPLIANCES and Q46_BUY ENERGY EFFICIENT APPLIANCES <> 0] What kinds of appliance(s) did you buy?

Response Option	Percent (n=43)*
Refrigerator	58%
Stand-alone freezer	9%
Dishwasher	30%
Clothes washer	37%
Clothes dryer	33%
Oven	26%
Microwave	21%
Other	7%
Don't know	2%

*Multiple responses were allowed for this question

Q48. [Ask if Q47 <> DON'T KNOW OR REFUSED] Was the [INSERT Q47 RESPONSE] an ENERGY STAR or high-efficiency model?

Response Option	Microwave	Refrigerator	Stand-alone Freezer	Dishwasher	Clothes washer	Clothes dryer	Oven	Other
Yes	8	22	4	13	12	11	0	3
No	0	1	0	0	1	0	0	0
Don't know	1	2	0	0	3	3	0	0
Total	9	25	4	13	16	14	0	3

Q49. [Ask if Q47 = CLOTHES DRYER] Does the new clothes dryer use natural gas?

Response Option	Percent (n=14)

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Yes	7%
No	93%
Don't know	0%

Q50. [Ask if Q41 = BOUGHT EFFICIENT HEATING OR COOLING EQUIPMENT and Q46_BUY EFFICIENT HEATING OR COOLING EQUIPMENT > 0] What type of heating or cooling equipment did you buy?

Response Option	Percent (n=16)*
Central air conditioner	38%
Window/room air conditioner unit	13%
Wall air conditioner unit	0%
Air source heat pump	44%
Geothermal heat pump	0%
Boiler	0%
Furnace	6%
Wifi thermostat	19%
Other	13%
Don't know	0%

*Multiple responses were allowed for this question

Q51. [Ask if Q50 = BOILER OR FURNACE] Does the new [INSERT Q50 RESPONSE] use natural gas?

Response Option	Percent (n=1)
Yes	100%
No	0%
Don't know	0%
Refused	0%

Q52. [Ask if Q50 <> WIFI-ENABLED THERMOSTAT, DON'T KNOW, OR REFUSED] Was the [INSERT Q50 RESPONSE] an ENERGY STAR or high-efficiency model?

Response Option	Other	Central air conditioner	Window / room air conditioner unit	Wall air conditioner unit	Air source heat pump	Geothermal heat pump	Boiler	Furnace
Yes	5	2	1	0	7	0	0	1
No	0	0	0	0	0	0	0	0
Don't know	1	0	1	0	0	0	0	0
Total	6	2	2	0	7	0	0	1

Q53. [Ask if Q41= BOUGHT EFFICIENT WINDOWS and Q46_BUY EFFICIENT WINDOWS >0] Do you know how many windows you installed?

Response Option	Percent (n=320)
Yes	3%
No	0%

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Don't know	0%
Not asked	97%

Please specify how many you installed:

Verbatim Response	Percent (n=9)
7	22%
10	11%
13	22%
14	11%
18	11%
19	11%
20	11%

Q54.   [Ask if Q41 = ADDED INSULATION and Q46_ADD INSULATION > 0] Please let us know what spaces you added insulation to. Also, let us know the proportion of each space you added insulation to (for example, if you added insulation that covered your entire attic space, you would type in 100%).

Response Option	Percent (n=22)*
Attic	64%
Walls	18%
Below the floor	64%

*Multiple responses were allowed for this question

Attic

Verbatim Response	Count (n=14)
40	2
50	5
60	1
80	1
90	1
100	4

Walls

Verbatim Response	Count (n=4)
50	3
100	1

Below the floor

Verbatim Response	Count (n=14)

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10	1
30	1
50	4
75	1
100	7

Q55. [Ask if Q41 = BOUGHT LEDS and Q46_BUY LEDS > 0] Do you know how many LEDs you installed at your property?

Response Option	Percent (n=66)
Yes	83%
No	17%

[Please specify how many you installed in the box below:]

Verbatim Response	Count (n=55)
2	2
3	2
4	2
5	7
6	4
7	1
8	5
9	1
10	8
12	8
14	2
15	2
16	2
20	4
24	1
25	1
27	1
31	1
40	1

Q56. [Ask if Q41 = BOUGHT CFLS and Q46_BUY CFLS > 0] Do you know how many CFLs you installed at your property?

Response Option	Percent (n=18)
Yes	89%
No	11%

[Please specify how many you installed in the box below:]

Verbatim Response	Count (n=16)
2	1
3	2
4	3

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5	2
6	1
7	2
9	1
10	1
12	1
15	1
20	1

Q57. [Ask if Q41 = INSTALLED AN ENERGY EFFICIENT WATER HEATER and Q46_INSTALL AN ENERGY EFFICIENT WATER HEATER > 0] Does the new water heater use natural gas?

Response Option	Percent (n=13)
Yes	0%
No	100%
Don't know	0%

Q58. [Ask if Q41 = INSTALLED AN ENERGY EFFICIENT WATER HEATER and Q46_INSTALL AN ENERGY EFFICIENT WATER HEATER > 0] Which of the following water heaters did you purchase?

Response Option	Percent (n=13)
A traditional water heater with a large tank that holds the hot water	77%
A tankless water heater that provides hot water on demand	15%
A solar water heater	0%
Other	8%
Don't know	0%

Q59. [Ask if Q41 = INSTALLED AN ENERGY EFFICIENT WATER HEATER and Q46_INSTALL AN ENERGY EFFICIENT WATER HEATER > 0] Is the new water heater an ENERGY STAR model?

Response Option	Percent (n=13)
Yes	85%
No	0%
Don't know	15%

Q60. Which of the following types of housing units would you say best describes your home? It is . . .?

Response Option	Percent (n=320)
Single-family detached house	78%
Single-family attached home (such as a townhouse or condo)	5%
Duplex, triplex or four-plex	1%
Apartment or condo with 5 units or more	3%
Manufactured or mobile home	12%
Other	1%
Don't know	1%

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Verbatim Other Response	Count (n=3)
Single family home with separate guest house	1
New construction	1
A house 4 bedrooms	1

Q61. How many showers are in your home? Please include both stand-up showers and bathtubs with showerheads.

Response Option	Percent (n=320)
One	27%
Two	62%
Three	10%
Four	1%
Five or more	0%
Don't know	1%

Q62. How many bathroom sink faucets are in your home? (Keep in mind that some bathrooms may have multiple bathroom sink faucets in them)

Response Option	Percent (n=320)
One	18%
Two	43%
Three	22%
Four	12%
Five	4%
Six	1%
Seven	1%
Eight or more	0%
Don't know	0%

Q63. How many kitchen faucets are in your home?

Response Option	Percent (n=320)
One	92%
Two	7%
Three	1%
Four or more	1%
Don't know	0%

Q63a. You mentioned that you have more than one kitchen faucet. Where is/are your other kitchen faucet(s) located in your home?

Verbatim Response	Frequency (n=28)
Laundry room	9
Basement/ lower level	9
Kitchen	2
Other	3

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Misread question- only one kitchen faucet	5

Q64. How many square feet of living space are there in your residence, including bathrooms, foyers and hallways (exclude garages, unfinished basements, and unheated porches)?

Response Option	Percent (n=320)
Less than 500 square feet	0%
500 to under 1,000 square feet	11%
1,000 to under 1,500 square feet	28%
1,500 to under 2,000 square feet	27%
2,000 to under 2,500 square feet	14%
2,500 to under 3,000 square feet	6%
Greater than 3,000 square feet	4%
Prefer not to say	1%
Don't know	9%

Q65. Do you or members of your household own your home, or do you rent it?

Response Option	Percent (n=320)
Own / buying	85%
Rent / lease	11%
Occupy rent-free	1%
Prefer not to say	3%
Don't know	0%

Q66. Including yourself, how many people currently live in your home year-round?

Response Option	Percent (n=320)
I live by myself	17%
Two people	41%
Three people	16%
Four people	12%
Five people	6%
Six people	3%
Seven people	0%
Eight or more people	1%
Prefer not to say	4%
Don't know	0%

Q67. What was your total annual household income for 2016, before taxes?

Response Option	Percent (n=320)
Under $20,000	7%
$20,000 to under $30,000	9%
$30,000 to under $40,000	8%
$40,000 to under $50,000	11%
$50,000 to under $60,000	4%
$60,000 to under $75,000	15%

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$75,000 to under $100,000	11%
$100,000 to under $150,000	7%
$150,000 to under $200,000	3%
$200,000 or more	1%
Prefer not to say	22%
Don't know	1%

Q68.   What is the highest level of education achieved among those living in your household?

Response Option	Percent (n=320)
Less than high school	2%
Some high school	1%
High school graduate or equivalent (such as GED)	15%
Trade or technical school	4%
Some college (including Associate degree)	27%
College degree (Bachelor's degree)	22%
Some graduate school	3%
Graduate degree, professional degree	18%
Doctorate	2%
Prefer not to say	7%
Don't know	0%

Q69.   Finally, what is your year of birth?

Response Option	Frequency (n=320)
18-24	2
25-34	39
35-44	49
45-54	54
55-64	53
65+	60
Prefer not to say	62

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Appendix F DEP Participant Survey Results

This section reports the results from each question in the DEP participant survey. Since the results reported in this appendix represent the "raw" data (that is, none of the open-ended responses have been coded and none of the scale questions have been binned), some values may be different from those reported in the Process Evaluation Findings chapter (particularly: percentages in tables with "Other" categories and scale response questions). Only respondents who completed the survey are included in the following results.

Q1.   [Read if mode = phone] Hi, I'm _____ , calling on behalf of Duke Energy. We are calling about the Save Energy and Water Kit you got from Duke Energy.

This kit included faucet aerators, one or two showerheads, and pipe tape that can help you save water and energy in your home. Do you recall receiving this kit?

Response Option	Percent (n=35)
Yes	100%
No	0%
Don't know	0%

Q2.   [Display if mode = web] We are conducting surveys about the Save Energy and Water Kit you got from Duke Energy. This kit included faucet aerators, one or two showerheads, and pipe tape that can help you save water and energy in your home.

Do you recall receiving this kit?

Response Option	Percent (n=308)
Yes	100%
No	0%
Don't know	0%

Q3.   DELETED

Q4.   Did you read the included instructions on how to install the items that came in the kit?

Response Option	Percent (n=343)
Yes	85%
No	11%
Don't remember	4%

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Q5.   [Ask if Q4 = YES] On a scale from 0 to 10, where 0 is not at all helpful and 10 is very helpful, how helpful were the instructions on how to install the items that came in the kit?

Response Option	Percent (n=291)
1- Not at all helpful	0%
1	0%
2	0%
3	0%
4	0%
5	3%
6	2%
7	8%
8	16%
9	17%
10 - Very helpful	51%
Don't Know	1%

Q6.   [Ask if Q5<7] What might have made the instructions more helpful?

Verbatim Response	Count (n=20)
We already knew how to install	1
Very clear details, with pictures and diagrams. Most i understood, but some items, such as the pipe wrap, i wasnt sure i would do right so didnt try. I am waiting for a friend to help me.	1
Tools that are actually needed	1
To give Troubleshooting tips. I couldn't get the shower faucet to attach...,	1
They may have help people without construction knowledge	1
The instructions were fine, it was the quality of the product that was sub-par.	1
Simple	1
Nothing really.	1
Nothing	1
N/A	1
More tools	1
More precise	1
More pictures	1
more photos	1
I didn't really need instructions.	1
easier way to attach them	1
Don't have good response	1
details	1
Clearer	1
?	1

Q7.   DELETED

        Q8.   DELETED

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Q9.   DELETED

Q10.   Have you or anyone else installed any of those items in your home, even if they were taken out later?

Response Option	Percent (n=343)
Yes	83%
No	17%
Don't Know	0%

Q11.   [Ask if Q10 = YES] Which of the items did you install, even if they were taken out later?

Response Option	Percent (n=285)*
Showerhead	79%
Bathroom faucet aerator	56%
Kitchen faucet aerator	64%
Pipe tape	44%
I don't remember	0%

*Multiple responses were allowed for this question

Q12.   [Ask if Q11 = SHOWERHEAD AND KIT_SIZE= MEDIUM] Your kit contained two showerheads. Did you install one or both of the showerheads in the kit, even if one or both were taken out later?

Response Option	Percent (n=97)
I installed both	56%
I only installed one showerhead	44%
Don't know	0%

Q13.   [Ask if Q11 = BATHROOM FAUCET AERATOR] How many of the bathroom faucet aerators from the kit did you install in your home, even if one or more were taken out later?

Response Option	Percent (n=181)
One	45%
Two	52%
Don't know	3%

Q14.   [Ask if Q11 = PIPEWRAP] Did you install all of the pipe insulation that was included with the kit?

Response Option	Percent (n=125)
Yes	77%
No	18%
Don't know	5%

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Q15.   [Ask if Q14 is displayed] About how many feet of the pipe extruding from your water heater did you tape with the insulation **that came in the kit**? Please go over to your water heater if you need to check.

Response Option	Percent (n=240)
About three feet or less	41%
About four to five feet	23%
About six feet or more	8%
Don't know	28%

Q16.   [Ask if any part of Q11 = YES] Overall, how satisfied are you with the item[s] you installed?

Showerhead

Response Option	Percent (n=224)
0 - Very dissatisfied	0%
1	1%
2	0%
3	1%
4	1%
5	5%
6	5%
7	7%
8	11%
9	11%
10 - Very satisfied	57%
Don't know	0%

Kitchen Faucet Aerator

Response Option	Percent (n= 159)
0 – Very dissatisfied	0%
1	1%
2	0%
3	2%
4	1%
5	3%
6	4%
7	8%
8	11%
9	11%
10 - Very satisfied	57%
Don't know	3%

Bathroom Faucet Aerator

Response Option	Percent (n= 181)
0 – Very dissatisfied	1%
1	2%

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2	0%
3	2%
4	2%
5	5%
6	3%
7	6%
8	12%
9	13%
10 - Very satisfied	51%
Don't know	3%

Pipe Tape

Response Option	Percent (n= 124)
0 – Very dissatisfied	0%
1	0%
2	1%
3	3%
4	2%
5	0%
6	3%
7	7%
8	10%
9	15%
10 - Very satisfied	53%
Don't know	7%

Q16a. Can you please explain any dissatisfaction you had with [DISPLAY ALL ITEMS IN Q16 THAT ARE <7]?

Showerhead

Verbatim Response	Count (n=32)
Truthfully the one I have already had better settings as far as adjusting the type of flow from the shower head and has a light to let you know when the temperature is correct. I really loved the original shower heads we had so they are now back on.	1
Too little water to take a shower in.	1
They reduced the water flow at first, but I can no longer see a reduction.	1
The water pressure coming out of the showerhead	1
The shower head was nice, we just prefer a shower head with a corded handset. That makes cleaning or washing the dog easier.	1
Style	1
Showering was not as enjoyable with the lower pressure.	1
Reduced water stream too much	1
pressure seems to be variable from time to time	1

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Pressure	1
On aa well they didn't perform well I purchased another online word much better	1
not really adjustable	1
Not enough water pressure	1
Not adjustable enough	1
NONE	1
No water pressure	1
Need more pressure	1
My water pressure was not very strong during the use of the showerhead	1
My husband thinks the water pressure is too low with this shower head. It doesn't bother me. I prefer to shower at the YMCA anyway.	1
My husband didn't like it because he said the flow was not strong enough.	1
its to slow of a flow	1
It was to small	1
It made for a miserable shower.	1
It didn't match my current faucet set up.	1
I prefer a handheld	1
I like more options with my shower head	1
Flimsy	1
Don't remember	1
Doesn't spray very hard	1
Didn't fit	1
Did not like the water pressure.	1
Can be better products	1

Kitchen Faucet Aerator

Verbatim Response	Count (n=18)
Worked ok	1
Too small	1
There wasn't enough water pressure. it made the water pressure very low in the sink.	1
Not adjustable enough	1
No water pressure	1
N/A	1
LOVE IT	1
It works fine, but restricted water flow presser when trying to rinse things off	1
It served its purpose of lowering water which is why I disliked it	1
It didn't seem to fit very well on our faucet.	1
I needed more pressure coming out	1
has very low pressure	1

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had to replace kitchen faucets not due to the aerator, it limits the water too much.	1
Don't remember	1
Didn't last long	1
Didn't like pressure	1
Couldn't get a correct fit even with the tape and wateoulhoot	1
Can be better	1

Bathroom Faucet Aerator

Verbatim Response	Count (n=26)
Worked ok	1
too big	1
The water pressure was reduced so much it makes it difficult to wash hands and brush teeth. It seems we use as lot more water this way.	1
The water pressure was really was really low	1
same as kitchen. both faucets ended up being replaced but not do to the aerator.	1
poor water flow	1
One seems to be working OK, but the other restricts water flow too much. Thinking about replacing it.	1
Not really sure I could tell the difference since it was installed with the new head	1
None	3
No water pressure	1
Neutral. Not dissatisfied.	1
Less pressure	1
Its ok for washing hands but if I have to fill up a cup or anything it takes too long	1
It was okay	1
It leaked and you couldn't get enough water to do anything with it.	1
It actually leaks a bit around the seal.	1
I wasn't dissatisfied just took some getting used to	1
I realize its purpose, but it needs more flow	1
Don't remember	1
Didn't like pressure	1
Didn't fit	1
Cheaply made	1
Cheap, there are better ones	1
Cheap feeling and were very tall. They were about twice the height as the original.	1

Pipe Tape

Verbatim Response	Count (n=11)
Unhappy with the way it looks	1
There was not enough	1

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Really need long lengths of foam pipe wrap. I have long runs of piping underneath of my home.	1
Not enough	1
Need more. Not enough in Kit.	1
It was good but the stuff you can buy at Lowe's is better	1
It did not adhere very well, even to clean pipe.	1
Don't remember	1
Didn't use	1
Averange	1
adhesive didn't stick very well	1

Q17.   Overall, how satisfied are you with Duke Energy's Save Energy and Water Kit Program?

Response Options	Percent (n=285)
0 - Very dissatisfied	1%
1	0%
2	0%
3	0%
4	1%
5	3%
6	2%
7	7%
8	13%
9	14%
10 - Very satisfied	58%
Don't know	1%

Q18.   [Ask if any part of Q11 = YES] Have you (or anyone in your home) uninstalled any of the items from the kit that you had previously installed?

Response Option	Percent (n=285)
Yes	15%
No	82%
Don't know	3%

Q19.   [Ask if Q18 = YES] Which of the items did you uninstall?

Response Option	Count (n=45)*
Showerhead	9
Kitchen faucet aerator	4
Bathroom faucet aerator	4
Pipe tape	1
Don't know	0

*Multiple responses were allowed for this question

Q20.   [Ask if Q19 = SHOWERHEAD and Q12 = INSTALLED BOTH] Did you uninstall one or both of the showerheads you had previously installed?

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Response Option	Percent (n=3)
I uninstalled both	67%
I only uninstalled one of the showerheads	33%
Don't know	0%

Q21.   [Ask if Q19 = BATHROOM FAUCET AERATOR and Q13 = 2-4] How many bathroom faucet aerators did you uninstall?

[No valid responses]

Q22.   [Ask if any item of Q19 is selected] Why were those items uninstalled?

Showerhead

Response Option	Percent (n=32)*
It was broken	7%
Didn't like how it worked	50%
Didn't like how it looked	10%
Other	37%
Don't know	3%

*Multiple responses were allowed for this question

Verbatim "Other" Responses	Count (n=11)
the flow was to slow	1
the cord wasn't long enough	1
Not enough pressure	1
Moved	1
Lower water flow	1
It was smaller than the one I had on the shower	1
It leaked really bad	1
It didn't fit right with the faucet.	1
I wanted the handset with hose. I will be installing this shower head at our vacation home.	1
i removed both shower heads and installed both	1
I felt like it didn't put out the same amount of water as the old one	1

Kitchen faucet aerator

Response Options	Percent (n=18)*
It was broken	13%
Didn't like how it worked	53%
Didn't like how it looked	13%
Other	40%
Don't know	0%

*Multiple responses were allowed for this question

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Verbatim "Other" Responses	Count (n=6)
Water would shoot out sides, couldn't get good long term fit. Was able to temporarily get a seal and was still	1
replaced faucets	1
Our water pressure is already bad and this device made it worse	1
Installed a kegan water filtration system.	1
I didn't remove it	1
Because we install a water filter	1

Bathroom faucet aerator

Response Options	Percent (n=10)*
It was broken	8%
Didn't like how it worked	33%
Didn't like how it looked	8%
Other	25%
Don't know	8%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=6)
Replaced the lavatory and faucet with a new one.	1
replaced faucets	1
Lower water flow	1
It kealed	1
I removed one bathroom aerator and replace on	1
I didn't remove it	1

Pipe Tape

Response Options	Percent (n=4)*
It was broken	0%
Didn't like how it worked	0%
Didn't like how it looked	%
Other	100%
Don't know	0%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=4)
Needs to have foam wrap. Also concerned if the pipe may start sweating or not due to condinsation	1
It wasn't removed	1
insulation	1
I wrapped my pipes with it	1

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Q23.   [Ask if any items not selected in Q11 or Q10 = NO] You said you haven't installed the following items. Which of the following do you plan to install in the next three months?

Response Option	Percent (total n=288)*
Showerhead	33%
Kitchen faucet aerator	26%
Bathroom faucet aerator	25%
Pipe tape	32%
I'm not planning on installing any of these in the next three months	22%
Don't know	33%

*Multiple responses were allowed for this question

Q24.   [Ask if any 1-6 options were not selected in Q23 or option "none" was selected] What's preventing you from installing those items?

Showerhead

Response Option	Percent (n=73)*
Already have an efficient showerhead	25%
Current one is still working	36%
Too difficult to install it, don't know how to do it	4%
Tried it, didn't fit	12%
Takes too much time to install it / No time / Too busy	0%
Tried it, didn't work as intended (please explain in the box below)	1%
Don't have the items any longer (threw away, gave away)	1%
Haven't gotten around to it	15%
Don't have the tools I need	1%
Didn't know what that was	0%
Other	86%
Don't know	1%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=14)
we like ours better	1
the water pressure	1
seems cheap	1
Quality isn't as good as what we currently have.	1
Not very attractive	1
Like the pull down one I have	1
it hideous	1
i have new shower heads currently	1
I have a dual head shower nozzle that I like better. It has colors to reflect safe temperatures so I don't have to worry about my son burning himself.	1
Have been ill with extended illness.	1
Have a multi head that is detachable for washing the dog.	1

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Didn't like the style, color of the showerheads. Wasn't sure what the kit would actually look like. Should have realized they'd be plain chrome.	1
because I tried the aerators and I felt the shower would have too little water pressure	1
All I received was the shower head	1

Kitchen faucet aerator

Response Option	Percent (n=129)*
Tried it, didn't fit	21%
Current one is still working	26%
Already have an efficient kitchen faucet aerator	22%
Haven't gotten around to it	16%
Too difficult to install it, don't know how to do it	2%
Tried it, didn't work as intended (please explain in the box below)	2%
Didn't know what that was	5%
Takes too much time to install it / No time / Too busy	1%
Don't have the items any longer (threw away, gave away)	2%
Don't have the tools I need	2%
Other	6%
Don't know	2%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=7)
Would not fit	1
Wont fit the faucet I have	1
the aerator is not threaded the same. I would have to replace the whole faucet.	1
only have 1 shower	1
my husband passed away so I have no one to install them.	1
my home just got rem	1
My faucet does not support this type of aerator	1
make flow too low	1
Landlord has not installed yet	1
it's not compatible with our kitchen faucet	1
I only received the one for the bathroom, there wasn't a one for the kitchen	1
I no longer live at the residence.	1
I like the faucet I have and you aerator doesn't work with it	1
I like my faucet and it isn't compatible	1
I have a water filter that prevents me from using the kitchen faucet aerator.	1
I don't think it fit ours. We have faucet that pulls down to turn into the sprayer.	1
I am replacing the entire shower and waiting to do it all at once.	1

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I already have a water filter and the aerator wont fit	1
Have an attachment for my water filter	1
Have a Pur water filter installed, will not fit because of that. Will use when sink is replaced.	1
getting to it	1
Gave this item away.	1
Gave it to a friend at work.	1
Doesn't match	1
Does not fit on current sink faucet.	1
does not fit my spray head	1
Did not get that item	1
Current kitchen faucet is the type that has retractable hose and faucet.	1
couldn't remove the other one	1
Also ugly.	1

Bathroom Faucet Aerator

Response Option	Percent(n=114)*
Tried it, didn't fit	18%
Current one is still working	32%
Already have an efficient bathroom faucet aerator	7%
Haven't gotten around to it	24%
Too difficult to install it, don't know how to do it	3%
Takes too much time to install it / No time / Too busy	0%
Don't have the items any longer (threw away, gave away)	3%
Don't have the tools I need	4%
Tried it, didn't work as intended (please explain in the box below)	2%
Didn't know what that was	4%
Other	4%
Don't know	4%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=17)
Won't work with my current bathroom faucet.	1
we were having renovations done on the bathrooms, the whole house.	1
the aerator is not threaded the same. I would have to replace the whole faucet.	1
my husband passed away so I have no one to install them.	1
make flow too low	1
Landlord hasn't installed yet	1
I no longer live at the residence.	1
I just installed new fixtures,	1
getting tpo ti	1
Gave this item away	1

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Gave it to a friend at work.	1
Faucet does not support this type of aerator	1
Don't want to lose water pressure	1
doesn't match	1
Did not get one	1
Did not get item	1
Been installed	1

Pipe Tape

Response Option	Percent (n=63)*
Already have pipetape	32%
Haven't gotten around to it	35%
Too difficult to install it, don't know how to do it	9%
Didn't know what that was	8%
Tried it, didn't work as intended (please explain in the box below)	0%
Takes too much time to install it / No time / Too busy	5%
Don't have the tools I need	1%
Don't have the items any longer (threw away, gave away)	1%
Other	2%
Don't know	2%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=3)
Using	1
unable to access pipes	1
too small. didn't fit all the way around.	1
They didn't fit my pipes	1
The piping is to hard to reach.	1
Replaced to tankless water heater	1
not enouph to wrap	1
No pipes eased to cold.	1
no need for the pipe wrap	1
My pipes are not exposed. Home is on a slab.	1
my husband passed away so I have no one to install them.	1
Kit didn't include it	1
Im not sure we got the pipe wrap or I just don't remember it	1
I no longer live at the residence.	1
I don't have any piping exposed requiring pipe wrap. I wish it came with a water heater wrap	1
I don't remember getting the pipe wrap, I have to look for it and I will install it. I was disappointed with the aerators and did not look in the box much	1
I didn't see a pipe wrap in the box	1
I didn't receive pipe wrap.	1

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Have read that it's not really very efficient	1
Hard to get to	1
Gave it to a friend at work.	1
Don't think it's needed, but will check.	1
DIDNT RECIEVE IT	1
Didn't have it in my kit.	1
did not get item	1
Did not get it	1
Can't get under the house	1
can't access pipe	1

Q24a. Customers that need additional assistance with their items can call a toll-free customer care hotline. Did you call the customer care hotline to seek assistance in installing any of your items?

Response Option	Percent (n=343)
Yes	2%
No	98%
Don't know	1%

Q24b. [ASK IF Q24a = 1] Did you call the customer care hotline to seek assistance in installing your kitchen faucet aerator?

Response Option	Percent (n=5)
Yes	40%
No	60%
Don't know	0%

Q24c. [ASK IF Q24b = 1] Did the customer care hotline offer to send you an adapter for the kitchen faucet aerator?

Response Option	Percent (n=2)
Yes	100%
No	0%
Don't know	0%

Q24d. [ASK IF Q24a = 1] Did you call the customer care hotline to seek assistance in installing your bathroom faucet aerator?

Response Option	Percent (n=5)
Yes	60%
No	40%
Don't know	0%

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Q24e. [ASK IF Q24d = 1] Did the customer care hotline offer to send you an adapter for the bathroom faucet aerator?

Response Option	Percent (n=3)
Yes	0%
No	67%
Don't know	33%

Q25. DELETED

Q26. DELETED

Q27. DELETED

Q28. DELETED

Q29. [Ask if Q11 = SHOWERHEAD and at least one showerhead is still installed] On average, what is the typical shower length in your household?

Response Option	Percent (n=196)
Two to four minutes	5%
Five to eight minutes	48%
Nine to twelve minutes	24%
Thirteen to fifteen minutes	10%
Sixteen to twenty minutes	9%
Twenty-one to thirty minutes	2%
Don't know	2%

Q30. [DISPLAY IF TWO SHOWERHEADS STILL INSTALLED: Thinking of the efficient showerhead you installed that gets the most usage…]

[DISPLAY IF ONE SHOWERHEAD STILL INSTALLED: Thinking of the efficient showerhead currently installed in your home…]

On average, how many showers per day are taken in this shower?

Response Option	Percent (n=196)
Less than one	8%
One	31%
Two	37%
Three	13%
Four	6%
Five	3%
Six	91%
Don't know	1%

Q31. [Ask if two showerheads still installed] Thinking of the other efficient showerhead you installed…

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On average, how many showers per day are taken in this shower?

Response Option	Percent (n=51)
Less than one	22%
One	43%
Two	22%
Three	10%
Four	4%
Five	0%
Six	0%
Seven	0%
Eight or more	0%
Don't know	0%

Q32. What fuel type does your water heater use?

Response Option	Percent (n=343)
Electric	88%
Natural gas	9%
Other (please specify in the box below)	2%
Don't know	1%

Verbatim "Other" Response	Count (n=6)
Propane and heating oil	1
Propane	5

Q33. [Ask if any item was selected in Q11 and it's not the case that all parts of Q19=selected (that is, they installed anything and did not uninstall everything they installed)] If you had not received the free efficiency items in the kit, would you have purchased and installed any of these same items within the next year?

Response Option	Percent (n=270)
Yes	22%
No	57%
Don't know	22%

Q34. [Ask if Q33 = YES] What items would you have purchased and installed within the next year?

Response Option	Count (n=58)*
Showerhead	31
Kitchen faucet aerator	19
Bathroom faucet aerator	15
Pipe tape	16
Don't know	5

*Multiple responses were allowed for this question

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Q35.   [Ask if Q34 = SHOWERHEAD and two showerheads are still installed] If you had not received them in your free kit, how many energy-efficient showerheads would you have purchased and installed within the next year?

Response Option	Percent (n=10)
One	30%
Two	60%
Don't know	10%

Q36.   [Ask if Q34 = BATHROOM FAUCET AERATOR and if more than one bathroom aerator is still installed] If you had not received them in your free kit, how many energy-efficient bathroom aerators would you have purchased and installed within the next year?

Response Option	Percent (n=9)
One	11%
Two	78%
Don't know	11%

Q37.   [If Q33 was displayed] Now, thinking about the energy and water savings items that were provided in the kit - using a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," how influential were the following factors on your decision to install the items from the kit? *How influential was…*

The fact that the items were free

Response Option	Percent (n=270)
1- Not at all influential	1%
1	0%
2	1%
3	0%
4	2%
5	2%
6	3%
7	2%
8	8%
9	11%
10 - Extremely influential	69%
Don't know	1%

The fact that the items were mailed to your home

Response Option	Percent (n=270)
0- Not at all influential	2%
1	1%
2	0%
3	0%
4	1%
5	1%
6	2%
7	2%
8	7%
9	10%

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10 - Extremely influential	74%
Don't know	1%

Information provided by Duke Energy about how the items would save energy and water

Response Option	Percent (n=270)
0- Not at all influential	1%
1	0%
2	1%
3	0%
4	1%
5	3%
6	2%
7	9%
8	10%
9	16%
10 - Extremely influential	56%
Don't know	1%

Other information or advertisements from Duke Energy, including its website

Response Option	Percent (n=270)
0- Not at all influential	11%
1	2%
2	3%
3	2%
4	3%
5	10%
6	4%
7	7%
8	7%
9	13%
10 - Extremely influential	33%
Don't know	6%

Q38.   DELETED

Q39.   DELETED

Q40.   Since receiving your kit from Duke Energy, have you purchased and installed any other **products** or made any improvements to your home to help save energy?

Response Option	Percent (n=343)
Yes	35%
No	62%
Don't know	3%

Q41.   [If Q40 = YES] What **products** have you purchased and installed to help save energy in your home?

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Response Option	Percent (n=120)*
Bought energy efficient appliances	38%
Moved into an ENERGY STAR home	3%
Bought efficient heating or cooling equipment	19%
Bought efficient windows	11%
Added insulation	19%
Sealed air leaks in windows, walls, or doors	35%
Sealed or insulated ducts	8%
Bought LEDs	71%
Bought CFLs	8%
Installed an energy efficient water heater	11%
None – no other actions taken	2%
Other	15%
Don't know	1%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=18)
use powerstrips on all electronics and turn them off when the units are not in use	1
Solar outdoor light	1
pool pump	1
new window	1
New roof installation	1
new roof and calked the windows	1
new doors	1
Installed storm door	1
Installed some new lightbulbs.	1
Installed screen doors	1
Installed insulated siding	1
I had someone come to my home and do an energy evaluation once a long time ago. i also bought a cover to seal the attic.	1
EchoBee thermostat,	1
Changed to a hand held shower head. It works great!	1
Bought curtains	1
Bought 2 new toilets that use 1.1-1.6 gallons of water and a new efficient water heater	1
Blanket for water heater.	1
Added weather stripping to the door	1

Q42. [If Q41 = MOVED INTO AN ENERGY STAR HOME] Is Duke Energy still your gas or electricity utility?

Response Option	Percent (n=3)
Yes	100%
No	0%
Don't know	0%

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Q43.   DELETED

Q44.   DELETED

Q45.   DELETED

Q46.   [Ask if any item in Q41 was selected] On a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential", how much influence did the Duke Energy Save Energy and Water Kit Program have on your decision to…

Response Option	0	1	2	3	4	5	6	7	8	9	10	Don't Know	Total (n)
Buy energy efficient appliances	28%	4%	0%	0%	2%	11%	2%	7%	11%	11%	24%	0%	46
Move into an ENERGY STAR home	0%	0%	0%	33%	0%	0%	0%	0%	33%	33%	0%	0%	3
Buy efficient heating or cooling equipment	39%	0%	0%	0%	0%	8%	0%	8%	13%	4%	22%	4%	23
Buy efficient windows	39%	0%	0%	8%	0%	8%	0%	0%	8%	8%	23%	8%	13
Add insulation	22%	0%	0%	0%	13%	0%	4%	9%	4%	13%	30%	4%	23
Seal air leaks	17%	0%	0%	2%	2%	2%	5%	5%	12%	17%	33%	5%	41
Seal ducts	22%	11%	0%	0%	0%	0%	0%	0%	0%	11%	44%	11%	9
Buy LEDs	19%	1%	1%	0%	2%	11%	4%	7%	6%	13%	33%	4%	81
Buy CFLs	10%	0%	0%	0%	0%	0%	0%	10%	10%	30%	30%	10%	10
Install an energy efficient water heater	15%	0%	0%	0%	0%	15%	8%	15%	15%	8%	23%	0%	13
Other	28%	6%	0%	0%	0%	22%	0%	0%	6%	0%	28%	11%	18

Q47.   [Ask if Q41 = BOUGHT ENERGY EFFICIENT APPLIANCES and Q46_BUY ENERGY EFFICIENT APPLIANCES <> 0] What kinds of appliance(s) did you buy?

Response Option	Percent (n33)*
Refrigerator	61%
Stand-alone freezer	6%
Dishwasher	42%
Clothes washer	42%
Clothes dryer	39%
Oven	21%
Microwave	27%
Other	3%
Don't know	0%

*Multiple responses were allowed for this question

Q48.   [Ask if Q47 <> DON'T KNOW OR REFUSED] Was the [INSERT Q47 RESPONSE] an ENERGY STAR or high-efficiency model?

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Response Option	Microwave	Refrigerator	Stand-alone Freezer	Dishwasher	Clothes washer	Clothes dryer	Other
Yes	8	19	2	12	12	12	1
No	0	0	0	1	0	0	0
Don't know	1	0	0	0	1	1	0
Total	9	19	2	13	13	13	1

Q49. [Ask if Q47 = CLOTHES DRYER] Does the new clothes dryer use natural gas?

Response Option	Percent (n=3)
Yes	8%
No	92%
Don't know	0%

Q50. [Ask if Q41 = BOUGHT EFFICIENT HEATING OR COOLING EQUIPMENT and Q46_BUY EFFICIENT HEATING OR COOLING EQUIPMENT > 0] What type of heating or cooling equipment did you buy?

Response Option	Percent (n=14)*
Central air conditioner	57%
Window/room air conditioner unit	0%
Wall air conditioner unit	7%
Air source heat pump	29%
Geothermal heat pump	7%
Boiler	0%
Furnace	7%
Wifi thermostat	29%
Other	7%
Don't know	0%

*Multiple responses were allowed for this question

Verbatim "Other" Response	Count (n=1)
fans and heaters	1

Q51. [Ask if Q50 = BOILER OR FURNACE] Does the new [INSERT Q50 RESPONSE] use natural gas?

Response Option	Percent (n=1)
Yes	0%
No	0%
Don't know	100%

Q52. [Ask if Q50 <> WIFI-ENABLED THERMOSTAT, DON'T KNOW, OR REFUSED] Was the [INSERT Q50 RESPONSE] an ENERGY STAR or high-efficiency model?

Response Option	Other	Central air conditioner	Window / room air conditioner unit	Wall air conditioner unit	Air source heat pump	Geothermal heat pump	Boiler	Furnace

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Yes	1	5	0	0	4	1	0	1
No	0	0	0	1	0	0	0	0
Don't know	0	3	0	0	0	0	0	0
Total	1	8	0	1	4	1	0	1

Q53.   [Ask if Q41= BOUGHT EFFICIENT WINDOWS and Q46_BUY EFFICIENT WINDOWS >0] Do you know how many windows you installed?

Response Option	Percent (n=8)
Yes	75%
No	25%
Don't know	0%
Not asked	100%

Please specify how many you installed:

Verbatim Response	Percent (n=6)
9	13%
10	25%
13	25%
15	13%

Q54.   [Ask if Q41 = ADDED INSULATION and Q46_ADD INSULATION > 0] Please let us know what spaces you added insulation to. Also, let us know the proportion of each space you added insulation to (for example, if you added insulation that covered your entire attic space, you would type in 100%).

Response Option	Percent (n=18)*
Attic	33%
Walls	33%
Below the floor	44%

*Multiple responses were allowed for this question

Attic

Verbatim Response	Count (n=6)
100	3
50	1
30	1
25	1

Walls

Verbatim Response	Count (n=6)

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100	1
75	1
50	1
30	1
15	1
14	1

Below the floor

Verbatim Response	Count (n=8)
100	4
25	1
20	2
10	1

Q55. [Ask if Q41 = BOUGHT LEDS and Q46_BUY LEDS > 0] Do you know how many LEDs you installed at your property?

Response Option	Percent (n=69)
Yes	77%
No	23%

[Please specify how many you installed in the box below:]

Verbatim Response	Count (n=53)
2	1
3	2
4	3
5	5
6	5
7	1
8	2
10	8
11	1
12	3
15	6
16	1
18	1
20	5
25	5
30	2
35	1

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56	1

Q56. [Ask if Q41 = BOUGHT CFLS and Q46_BUY CFLS > 0] Do you know how many CFLs you installed at your property?

Response Option	Percent (n=9)
Yes	67%
No	33%

[Please specify how many you installed in the box below:]

Verbatim Response	Count (n=6)
2	1
3	2
4	1
10	2
15	1

Q57. [Ask if Q41 = INSTALLED AN ENERGY EFFICIENT WATER HEATER and Q46_INSTALL AN ENERGY EFFICIENT WATER HEATER > 0] Does the new water heater use natural gas?

Response Option	Percent (n=4)
Yes	18%
No	82%
Don't know	0%

Q58. [Ask if Q41 = INSTALLED AN ENERGY EFFICIENT WATER HEATER and Q46_INSTALL AN ENERGY EFFICIENT WATER HEATER > 0] Which of the following water heaters did you purchase?

Response Option	Percent (n=11)
A traditional water heater with a large tank that holds the hot water	73%
A tankless water heater that provides hot water on demand	18%
A solar water heater	0%
Other	9%
Don't know	0%

Q59. [Ask if Q41 = INSTALLED AN ENERGY EFFICIENT WATER HEATER and Q46_INSTALL AN ENERGY EFFICIENT WATER HEATER > 0] Is the new water heater an ENERGY STAR model?

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Response Option	Percent (n=11)
Yes	91%
No	9%
Don't know	0%

Q60. Which of the following types of housing units would you say best describes your home? It is . . .?

Response Option	Percent (n=343)
Single-family detached house	77%
Single-family attached home (such as a townhouse or condo)	6%
Duplex, triplex or four-plex	1%
Apartment or condo with 5 units or more	2%
Manufactured or mobile home	12%
Other	1%
Don't know	1%

Q61. How many showers are in your home? Please include both stand-up showers and bathtubs with showerheads.

Response Option	Percent (n=343)
One	16%
Two	70%
Three	11%
Four	2%
Five or more	1%
Don't know	1%

Q62. How many bathroom sink faucets are in your home? (Keep in mind that some bathrooms may have multiple bathroom sink faucets in them)

Response Option	Percent (n=343)
One	9%
Two	38%
Three	30%
Four	15%
Five	4%
Six	2%
Seven	0%
Eight or more	1%
Don't know	1%

Q63. How many kitchen faucets are in your home?

Response Option	Percent (n=343)
One	92%
Two	5%
Three	2%
Four or more	1%

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Don't know	1%

Q63a. You mentioned that you have more than one kitchen faucet. Where is/are your other kitchen faucet(s) located in your home?

Response Option	Frequency (n=27)
Laundry room	11%
Basement/lower level	19%
Kitchen	33%
Other	22%
Misread question-only one kitchen faucet	22%

Q64. How many square feet of living space are there in your residence, including bathrooms, foyers and hallways (exclude garages, unfinished basements, and unheated porches)?

Response Option	Percent (n=343)
Less than 500 square feet	1%
500 to under 1,000 square feet	7%
1,000 to under 1,500 square feet	31%
1,500 to under 2,000 square feet	23%
2,000 to under 2,500 square feet	16%
2,500 to under 3,000 square feet	7%
Greater than 3,000 square feet	5%
Prefer not to say	1%
Don't know	9%

Q65. Do you or members of your household own your home, or do you rent it?

Response Option	Percent (n=343)
Own / buying	88%
Rent / lease	9%
Occupy rent-free	0%
Prefer not to say	3%
Don't know	1%

Q66. Including yourself, how many people currently live in your home year-round?

Response Option	Percent (n=343)
I live by myself	18%
Two people	36%
Three people	17%
Four people	16%
Five people	5%
Six people	2%
Seven people	0%

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Eight or more people	1%
Prefer not to say	4%
Don't know	1%

Q67. What was your total annual household income for 2016, before taxes?

Response Option	Percent (n=343)
Under $20,000	7%
$20,000 to under $30,000	8%
$30,000 to under $40,000	8%
$40,000 to under $50,000	10%
$50,000 to under $60,000	8%
$60,000 to under $75,000	11%
$75,000 to under $100,000	12%
$100,000 to under $150,000	7%
$150,000 to under $200,000	2%
$200,000 or more	3%
Prefer not to say	23%
Don't know	2%

Q68. What is the highest level of education achieved among those living in your household?

Response Option	Percent (n=343)
Less than high school	0%
Some high school	0%
High school graduate or equivalent (such as GED)	12%
Trade or technical school	8%
Some college (including Associate degree)	23%
College degree (Bachelor's degree)	25%
Some graduate school	3%
Graduate degree, professional degree	16%
Doctorate	4%
Prefer not to say	9%
Don't know	1%

Q69. Finally, what is your year of birth?

Response Option	Frequency (n=343)
18-24	1
25-34	39
35-44	58
45-54	52
55-64	54
65+	53
Prefer not to say	86

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Appendix G   Participant Demographics by State

	DEC				DEP			
Home type	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
Single-family detached	76%	176	83%	72	77%	229	78%	35
Single-family attached	5%	12	3%	3	7%	21	2%	1
Duplex, triplex, four-plex	2%	4	0%	0	1%	4	0%	0
Apartment or condo 5 units or more	3%	6	2%	2	2%	6	0%	0
Manufactured or mobile home	14%	32	8%	7	11%	33	18%	8
Other	1%	2	1%	1	1%	2	2%	1
Don't know	0%	1	2%	2	1%	3	0%	0
Home size	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
Less than 500 square feet	0%	1	0%	0	1%	2	4%	2
500 to under 1,000 square feet	12%	28	8%	7	8%	23	4%	2
1,000 to under 1,500 square feet	31%	71	23%	20	31%	93	31%%	14
1,500 to under 2,000 square feet	28%	64	25%	22	24%	71	18%	8
2,000 to under 2,500 square feet	14%	32	14%	12	16%	48	18%	8
2,500 to under 3,000 square feet	5%	11	10%	9	7%	21	4%	2
Greater than 3,000 square feet	3%	7	7%	6	5%	15	4%	2
Don't know	8%	18	12%	10	7%	22	16%	7
Prefer not to say	0%	1	1%	1	1%	3	0%	0
Ownership Status	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
Own / buying	85%	197	86%	75	87%	259	96%	43
Rent / lease	12%	28	9%	8	0%	27	4%	2
Occupy rent-free	1%	2	0%	0	0%	1	0%	0
Don't know	0%	0	1%	1	1%	2	0%	0
Prefer not to say	3%	6	3%	3	3%	9	0%	0
Water Heater Fuel Type	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
Electric	86%	201	87%	76	87%	260	93%	42
Natural Gas	12%	27	9%	8	9%	28	7%	3
Other	0%	1	1%	1	2%	6	0%	0
Don't know	2%	4	2%	2	1%	4	0%	0
Household Size	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
I live by myself	19%	44	12%	10	18%	53	18%	8
Two people	37%	87	52%	45	36%	107	38%	17
Three people	18%	41	13%	11	18%	53	13%	6
Four people	12%	29	9%	8	16%	47	20%	9
Five people	5%	11	9%	8	5%	15	4%	2
Six people	3%	8	2%	2	2%	5	2%	1
Seven people	0%	1	0%	0	0%	1	0%	0
Eight or more people	1%	2	0%	0	0%	1	2%	1
Don't know	0%	0	1%	1	1%	2	0%	0
Prefer not to say	4%	10	2%	2	5%	14	2%	1

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Household Income	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
Under $20,000	9%	20	3%	3	6%	18	13%	6
20 to under $30,000	8%	19	13%	11	7%	20	13%	6
30 to under $40,000	9%	21	7%	6	8%	24	4%	2
40 to under $50,000	12%	27	10%	9	10%	29	13%	6
50 to under $60,000	5%	12	2%	2	8%	24	4%	2
60 to under $75,000	14%	32	17%	15	12%	35	9%	4
75 to under $100,000	9%	21	16%	14	11%	34	16%	7
100 to under $150,000	8%	19	5%	4	8%	23	2%	1
150 to under $200,000	2%	5	3%	3	2%	6	0%	0
$200,000 or more	1%	2	1%	1	3%	9	0%	0
Don't know	1%	3	1%	1	2%	6	2%	1
Prefer not to say	22%	52	21%	18	24%	70	22%	10
Education Level	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
Less than high school	2%	4	1%	1	0%	0	2%	1
Some high school	1%	3	1%	1	0%	0	2%	1
High school graduate or equivalent (such as GED)	15%	35	14%	12	11%	33	20%	9
Trade or technical school	5%	11	3%	3	6%	18	18%	8
Some college (including Associate degree)	26%	61	28%	24	25%	75	11%	5
College degree (Bachelor's degree)	21%	48	26%	23	26%	76	20%	9
Some graduate school	3%	8	1%	1	2%	7	4%	2
Graduate degree, professional degree	18%	42	16%	14	16%	48	11%	5
Doctorate	2%	5	2%	2	4%	11	2%	1
Don't know	0%	0	1%	1	1%	2	0%	0
Prefer not to say	7%	16	6%	5	9%	28	9%	4
Age	NC (%)	NC (n)	SC (%)	SC (n)	NC (%)	NC (n)	SC (%)	SC (n)
18-24	1%	2	0%	0	0%	1	0%	0
25-34	12%	29	17%	15	11%	34	11%	5
35-44	16%	38	11%	10	17%	52	13%	6
45-54	18%	43	15%	13	16%	49	7%	3
55-64	17%	40	14%	12	13%	40	31%	14
65+	16%	38	21%	18	14%	42	24%	11
Prefer not to say	18%	43	22%	19	27%	80	13%	6

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Appendix H   Participant Responses by State

Measurement	Carolinas		Progress	
	NC	SC	NC	SC
Survey Responses	233	87	297	45
Small Kit	155	49	167	24
Medium Kit	78	38	116	13
Average Occupants per Home	2.61	2.58	2.60	2.73
Electric Water Heater %	88%	89%	88%	93%
Showerheads				
Provided	311	125	422	59
Installed	179	65	241	37
Installed %	58%	52%	57%	63%
Removed %	9%	11%	12%	8%
In-service Rate	52%	46%	50%	58%
Shower per Day (per person)	1.02	1.10	0.98	1.09
Minutes per Shower	8.96	9.48	9.58	9.69
Showerheads per Home	1.33	1.34	1.43	1.37
Kitchen Faucet Aerator				
Provided	233	87	297	45
Installed	100	42	135	24
Installed %	43%	48%	45%	53%
Removed %	11%	14%	10%	4%
In-service Rate	38%	41%	41%	51%
Bathroom Faucet Aerator				
Provided	466	174	594	90
Installed	139	63	230	40
Installed %	30%	36%	39%	44%
Removed %	5%	5%	5%	0%
In-service Rate	28%	34%	37%	44%
Pipe Wrap				
Provided	233	87	297	45
Installed	88	27	106	18
Installed %	38%	31%	36%	40%
Removed %	1%	0%	3%	6%
In-service Rate	37%	31%	35%	38%
Length Installed	5.10	4.70	4.68	5.39

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EM&V Activities

Planned Evaluation, Measurement and Verification (EM&V) Activities through the rate period (Dec. 31, 2021)

Evaluation is a term adopted by Duke Energy Progress (DEP), and refers generally to the systematic process of gathering information on program activities, quantifying energy and demand impacts, and reporting overall effectiveness of program efforts. Within evaluation, the activity of measurement and verification (M&V) refers to the collection and analysis of data at a participating facility/project. Together this is referred to as "EM&V."

Refer to the accompanying Evans Exhibit 11 chart for a schedule of process and impact evaluation analysis and reports that are currently scheduled.

Energy Efficiency Portfolio Evaluation

DEP has contracted with independent, third-party evaluation consultants to provide the appropriate EM&V support, including the development and implementation of an evaluation plan designed to measure the energy and demand impacts of the residential and non-residential energy efficiency programs.

Typical EM&V activities:

- Develop evaluation action plan
- Process evaluation interviews
- Collect program data
- Verify measure installation and performance through surveys and/or on-site visits
- Program database review
- Impact data analysis
- Reporting

The process evaluation provides unbiased information on past program performance, current implementation strategies and opportunities for future program improvements. Typically, the data collection for process evaluation consists of surveys with program management, implementation vendor(s), program partner(s), and participants; and, in some cases, non-participants. A statistically representative sample of participants will be selected for the analysis.

The impact evaluation provides energy and demand savings resulting from the program. Impact analysis may involve engineering analysis (formulas/algorithms), billing analysis, statistically adjusted engineering methods, and/or building simulation models, depending on the program and the nature of the impacts. Data collection may involve surveys and/or site visits. A statistically representative sample of participants is selected for the analysis. Duke Energy Progress intends to follow industry-accepted methodologies for all measurement and

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verification activities, consistent with International Performance Measurement Verification Protocol (IPMVP) Options A, C or D depending on the measure.

The field of evaluation is constantly learning from ongoing data collection and analysis, and best practices for evaluation, measurement and verification continually evolve. As updated best practices are identified in the industry, DEP will consider these and revise evaluation plans as appropriate to provide accurate and cost-effective evaluation.

Demand Response Program Evaluation

DEP has contracted with independent, third-party evaluation consultants to provide an independent review of the evaluation plan designed to measure the demand impacts of the residential and non-residential demand response programs and the final results of that evaluation.

Typical EM&V activities:

- Collect program data
- Process evaluation interviews
- Verify operability and performance through on-site visits
- Collect interval data
- Program database review
- Benchmarking research
- Dispatch optimization modeling
- Impact data analysis
- Reporting

The process evaluation provides unbiased information on past program performance, current implementation strategies and opportunities for future improvements. Typically, the data collection for process evaluation consists of surveys with program management, implementation vendor(s), program partner(s), and participants; and, in some cases, non-participants. A statistically representative sample of participants will be selected for the analysis.

The impact evaluation provides demand savings resulting from the program. Impact analysis for EnergyWise involves a simulation model to calculate the duty cycle reduction, and then an overall load reduction. Impact analysis for CIG-DR involves statistical modeling of an M&V baseline load shape for a customer, then modeling the event period baseline load shape and comparing to the actual load curve of the customer during the event period.

The field of evaluation is constantly learning from ongoing data collection and analysis, and best practices for evaluation, measurement and verification continually evolve. As updated best practices are identified in the industry, DEP will consider these and revise evaluation plans as appropriate to provide accurate and cost-effective evaluation.

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DEP DSM/EE Programs - Anticipated EM&V Schedule
As of June 3, 2020

DEP DSM/EE Programs - Anticipated EM&V Schedule

Program Name	NC Docket	SC Docket	Short name	2020 2nd Quarter	2020 3rd Quarter	2020 4th Quarter	2021 1st Quarter	2021 2nd Quarter	2021 3rd Quarter	2021 4th Quarter	Notes
Commercial Demand Response	Docket No. E-2, Sub 953	Docket 2010-41-E	CIG DR			REP [(2019)]				REP [(2020)]	tentative
Distribution System Demand Response	Docket No. E-2, Sub 926	Docket 2009-190-E	DSDR								
Nonresidential Smart $aver EE Products & Assessment (Prescriptive)	Docket No. E-2, Sub 938	Docket 2009-190-E	EEB	REP					PROC/IMP	PROC/IMP	Smart $aver Prescriptive DEC combined with DEP
Nonresidential Smart $aver EE Products & Assessment (Custom)	Docket No. E-2, Sub 938	Docket 2009-190-E	EEB	PROC/IMP	PROC/IMP	PROC/IMP	PROC/IMP	REP			EEB Custom projects combined with DEC Smart $aver Custom eval report
EnergyWise	Docket No. E-2, Sub 927	Docket 2009-190-E	EW	REP [(S2019)]		REP [(W2019/2020)]	REP [(S2020)]				Summer 2020 tentative due to COVID-19
EnergyWise for Business	Docket No. E-2, Sub 1086	Docket 2015-163-E	EWB					PROC/IMP	PROC/IMP	REP	Summer 2021 impacts only due to COVID-19
Energy Efficiency Education	Docket No. E-2, Sub 1060	Docket 2014-420-E	K12				PROC/IMP	PROC/IMP	REP		Final report planned for Q3-2021
Residential Energy Assessment	Docket No. E-2, Sub 1094	Docket 2016-82-E	REA					PROC/IMP	PROC/IMP	PROC/IMP	Combined DEC/DEP evaluation in mid 2022; eval timing delayed due to COVID-19
Lighting (Retail)	Docket No. E-2, Sub 950	Docket 2010-41-E	LP								Future evaluation timing tbd; more focused on hard-to-reach retailers
Multi-Family Energy Efficiency	Docket No. E-2, Sub 1059	Docket 2014-419-E	MF	REP						PROC/IMP	Will be combined DEC/DEP evaluation; evaluation schedule extended
My Home Energy Report	Docket No. E-2, Sub 989	Docket 2011-180-E	MyHER				PROC/IMP	PROC/IMP	PROC/IMP	PROC/IMP	Final report planned for Q4-2021
Neighborhood Energy Saver	Docket No. E-2, Sub 952	Docket 2009-190-E	NES				PROC/IMP	PROC/IMP	PROC/IMP	REP	Evaluation to be combined with DEC evaluation; may be sooner than 4Q-21
Residential New Construction	Docket No. E-2, Sub 1021	Docket 2015-237-E	RNC								Next evaluation tbd
Residential Save Energy & Water Kit	Docket No. E-2 Sub 1085	Docket 2015-322-E	SEW	REP					PROC/IMP	PROC/IMP	To be combined with DEC evaluation; final report planned for Q2-2022
Small Business Energy Saver	Docket No. E-2, Sub 1022	Docket 2015-163-E	SBES			PROC/IMP	REP				1Q-2021 tentative
Residential HVAC	Docket E-2, Sub 936		HVAC					PROC/IMP	PROC/IMP	PROC/IMP	final report planned for Q2-2022

LEGEND	
PROC	Process surveys/interviews (customers or other) for purposes of report that follows
IMP	Impact data collection (onsites, billing data) and analysis for purposes of report that follows
REP	Evaluation, Measurement & Verification Report

NOTE: THESE DATES ARE SUBJECT TO CHANGE